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COMPUTERWORLD

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Advanced technology: Squeezing more disk storage onto a smaller space. Page 17.

IBM midrange users carving own path

AS/400 irony: Some buyers replacing mainframes with low-margin minis

Increasingly, the customer leads, Big Blue follows

BY MARYFRAN JOHNSON
CW STAFF

BY ROSEMARY HAMILTON
CW STAFF

Longtime IBM mainframe shops such as Georgia-Pacific, Pepperidge Farm and Hills Pet Products are saving big money by abandoning big systems, creating an unexpected and somewhat unwelcome market for IBM's Application System/400 midrange machines.

Companies that are changing the way they do business or decentralizing their information systems are most likely to migrate downward to the AS/400 platform, IBM spokesman Tim Ohsann said. "It depends on the customers' applications and what works best for them," he said.

However, the substantial savings to be gained seem to be the biggest lure of all.

Among the companies moving from IBM mainframes to minis, consultants said, are Playboy Enterprises, Inc., Hiram Walker & Sons, Inc., Kaiser Aluminum & Chemical Corp., U.S. Shoe Corp., Harley-Davidson, Inc., Arco Chemical Co. and Johnson & Johnson.

In Atlanta, Georgia-Pacific Corp. is winding up a two-year project designed to eliminate its IBM 3081 mainframe by replacing the machine with 20 AS/400s and several System/36s on a Token-Ring network that includes 150 IBM Personal System/2a.

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Sometimes, what goes around comes around.

Not so long ago, many users were having trouble keeping up with IBM's midrange strategy. They could not make sense of the company's grab bag of midrange options and were not entirely clear as to what IBM's direction was or where it would take them.

However, recent evidence suggests it is now IBM's turn to keep up. Just last week, the company bolstered its midrange offerings and defended them at length in the face of persistent industry skepticism.

Nonetheless, a growing number of users are charting their own directions rather than watching where the company goes. Users are either rejecting IBM's midrange line entirely or using the systems in ways that they see fit, which are not necessarily ways IBM had considered.

Recent interviews with 15 large user sites showed the following trends:

- A growing number of shops are using the Application System/400 midrange as a replacement for IBM mainframes (see story at left).
- Several traditional large mainframe sites are either relying on a two-tiered computing strategy or heading in that direction. They have reviewed IBM's proprietary midrange offerings and determined that they will play either a minimal role or no role at all.
- Others are mixing AS/400s into 370 environments instead of relying on the 370 midrange, the 9370. In other words, the

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Sorting it out

- IBM bolsters entry points for AS/400, ES/9370 lines.
- Treading a fine line to avoid cannibalization by AIX systems.
- Flash! A 9370 success story as Sears reveals usage.
- AIX preview — Steve Jobs' interface is an option.

Stories, pages 120, 121.

Apple's turnover sours image

BY JAMES DALY
and RICHARD PASTORE
CW STAFF

CUPERTINO, Calif. — With Apple Computer, Inc.'s executive suite in apparent disarray, customers and observers last week were looking for some signal that Chief Executive Officer John Sculley has a workable strategy to put an end to recent product criticisms and pull the company out of its sales slump.

A chilly wind continued to whip through Apple's high-level offices last week when reports surfaced that Jean-Louis Gassee, the flashy captain of the firm's new products strategy, may soon resign the post he has held for five years.

The departure, coming on the heels of Apple USA President Allan Loren's resignation [CW, Feb. 5], would leave a major power vacuum at a time when strong leadership is needed to deliver Apple from its present funk. Analysts have no clear picture of what Sculley would do to fill such a void, however.

"I don't see an obvious successor to Jean-Louis. My guess is, someone will come in from the outside," said Dick Shaffer, president of analysis firm Technologic Partners in New York.

If that is the case, Apple's product situation may get worse before it gets better, said Melinda Reach, an analyst at Merrill Lynch Research/U.S. in New York. "It's unlikely that a new person from the outside will understand the Apple product line well enough to make immediate changes," she said. "If anything, there will be a disruption of products."

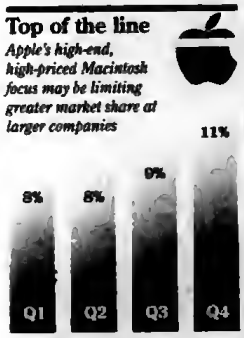
Neither Gassee nor Sculley returned phone calls. However, a spokeswoman said that although Gassee remains president of the products group, "there have been discussions as to his future role with Apple."

Alan Soucy, a vice-president at the MACIS user group and manager of computing standards at Martin Marietta Information Systems Group, which has about 6,000 Macintoshes installed, said that the departure of Gassee

Continued on page 119

Top of the line

Apple's high-end, high-priced Macintosh focus may be limiting greater market share at larger companies



Percent of Apple's market share with firms having 500 or more employees

SOURCE: COMPUTER INTELLIGENCE CW CHART: JOHN VOSS

Microsoft eye on unusual target: MVS

BY PATRICIA KEEFE
CW STAFF

Microsoft Corp. teamed up with Micro Tempus, Inc. last week, lifting the curtain — a good 12 months prior to availability — on LAN Manager/MVS, a mainframe server that will support DOS, OS/2 and Microsoft Windows clients.

LAN Manager/MVS would turn the mainframe into a massive server and a gateway through which administrators could manage distributed local-area networks.

The two companies said that network administrators will be able to manage LAN Manager/MVS with their personal computer-based management tools. Additionally, remote users not attached to a LAN will still be able to access the MVS server.

The product will not go into

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Quotable

"If LANS become powerful enough, what do I need a mini for?"

FRANK ERBRICK
UPS

On the move away from IBM's midrange. See story page 1.

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UPDATE

Once-popular analyst Will Zachmann characterized you 'obsolete DP types' as having 'rectangular-shaped, pale-blue heads stuck firmly in the sand' in his latest diatribe in *PC Magazine*. Will has never been real careful about hiding his disdain for IBM, but he has been more careful about hiding his ignorance of the IS community. Simply put, old Zack feels that anyone who buys anything other than microprocessor-based systems is a damned fool. Stuck in a time warp himself, Will hasn't had many new ideas in some time. Those who can, do. Those who can't, write the same mindless tripe column after column after column . . .

Breakthroughs in storage might depend on the use of disk arrays. Page 17.

Gary Bogdan/Picture Group

Good software maintenance documentation can save you bundles, according to quality guru William E. Perry. Page 87.

EXECUTIVE BRIEFING

■ **Despite IBM's three-tiered architecture strategy,** most users are opting for two tiers. A slew of traditional mainframe shops such as Georgia-Pacific are abandoning 370s for AS/400 hosts, while mainframe loyalists, such as Metropolitan Life, see a limited need for a midrange level as networked PCs gain in power. A path to the latter strategy became clearer last week with the unveiling of Microsoft and Micro Tempus' LAN Manager/MVS, although the product won't be available until next year. **See stories, page 1.**

■ **Partnering between information systems and business managers** is becoming more commonplace in corporate America. At Air Products and Chemicals, IS manager Paul Prutzman is even joining in on sales calls to prospective customers along with business manager George Diehl. Executive Report examines this new phenomenon and provides guidelines for partnering without tears. **Page 77.**

■ **Most high-level IS executives** are happy in their jobs, according to the annual SIM membership survey. The study revealed an average salary of $207,140 for top information systems executives who control budgets of more than $100 million. **Page 4.**

■ **Four alleged computer hackers** were indicted in Chicago and Atlanta on charges of stealing a 911 emergency program from Bellsouth and uploading it to a computer bulletin board. The accused are members of the so-called Legion of Doom hacker network. **Page 8.**

■ **Ameritech's top IS executive** was named vice-president of corporate strategies. James Heidenreich will add strategic business planning and review to his current information systems responsibilities. **Page 4.**

■ **Wal-Mart's storybook success** in the retail industry relies heavily on satellite technology, EDI and "quick response," the industry's equivalent to just-in-time manufacturing. Underneath the firm's down-home exterior in an Arkansas town lies a leading-edge IS strategy. **Page 69.**

■ **Effective LAN management tools** are scarce and sketchy, users say. Acknowledging the product gap, IBM, DEC and AT&T are negotiating with the likes of 3Com and Novell in an attempt to provide users with better LAN offerings. **Stories, page 12.**

■ **Midrange product announcements** took center stage for IBM. It rolled out new low-end models of both the AS/400 and 9370 lines, substantially lowering the entry cost for buyers. **Page 120.**

■ **The government's computerized patent search system** has improved considerably, according to an advisory panel. The same panel harshly criticized the patent automation effort 18 months ago. **Page 7.**

■ **On-site this week:** North American Van Lines has completed a major moving job — the migration from a 60-year-old paper filing system to optical storage. A Filenet optical disc jukebox linked to an Amdahl mainframe helps North American process between 4,000 and 7,500 documents daily. **Page 25.** Also on the move is Pan American World Airways, which has to fly fast to make up for lost time in corporatewide networking. Pan Am is replacing three incompatible data networks with a multinational X.25 packet-switched network from Racal-Milgo. **Page 63.** Moving more slowly is Mellon Bank, which is gingerly dipping its toes into the uncertain waters of ISDN. This year, Mellon plans to test desktop conferencing, an application that allows a customer and bank employee to simultaneously view and change customer account data. **Page 65.**

You Shouldn't Be Punished For Moving Up To A Relational Database.

COMPUTER ASSOCIATES

VSAM, DL/I and IMS are products of the IBM Corporation

No regrets for systems execs

BY ALAN J. RYAN
CW STAFF

Do it all over again? Sure they would. Three out of four information systems professionals are happy in their current positions and say if they could start over, they would likely or definitely select the same field.

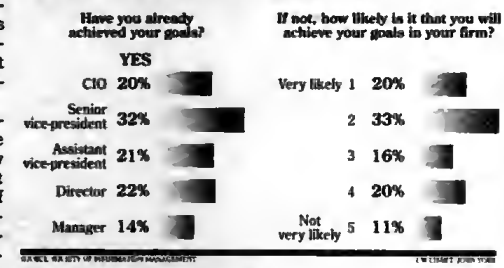
Those were some of the results of a Senior IS Executive Profile compiled by the Society for Information Management (SIM), based on a 1989 survey of 420 SIM International members. Those surveyed had job titles such as chief information officer, corporate executive vice-president, senior vice-president, assistant vice-president, director, associate director and manager.

The survey showed that among the respondents, the highest paid IS executives are CIOs in companies with IS budgets over $100 million, who take home an average pay of $207,140 each year.

General satisfaction with careers in IS was fairly constant for IS executives through all salary levels, the study found. Not surprisingly, officials earning more than $125,000 annually were more likely than the others to say they are very satisfied with their careers.

Reaching for the brass ring

Although relatively few IS executives have achieved their career goals, a majority of them believe they can do so with their current firm



SOURCE: SOCIETY OF INFORMATION MANAGEMENT — CW CHART: JOHN YORK

The survey revealed that senior IS workers "have a high level of satisfaction with their career and with their current position," said Ed Mills, vice-president of systems and operations at the U.S. Committee for Unicef in New York and a SIM member who put together the salary survey.

"You could say life is better at the top," Mills said. "If you were to do a survey of more junior levels in the systems field, you probably would not find the same results."

Of those who hold the title of vice-president, approximately one-third said they had achieved their career goals. Older executives in the poll showed a higher incidence of career goal achievement than younger executives.

Out of the group of IS professionals who said they are still working toward their career goals, a little more than 50% said they are likely or very likely to meet those goals at their current firms.

Those in the highest IS positions indicated they are more likely to move to careers beyond IS if they are promoted, while 84% of those in lower IS management posts said their next promotion will probably be in the IS area.

In companies with an annual IS budget of less than $20 million, salary ranges for respondents averaged from $71,790 for those with the title of manager to $120,110 for CIOs. The range was from $84,870 for manager to $154,610 for CIOs in companies whose IS budgets were between $20 million and $100 million. For companies with IS budgets higher than $100 million, the range was from $87,500 for manager to $207,140 for CIO.

The researchers said they were surprised to find that the education of the IS executive did not make much difference in salary. The salaries of those with master's degrees and those with bachelor's degrees were close at all levels.

School rule

Nearly 60% of the IS executives taking the poll said they have earned a master's degree, up 3% from a 1987 survey.

The companies the IS executives surveyed work for were typically public corporations (65%), with annual sales volume of between $250 million and $5 billion (58%). Many were manufacturing companies (40%), insurance (10%) or finance companies (8%).

Forty-five percent of the executives said their IS organizations were moving toward decentralization, while 28% said their companies were headed toward a more centralized IS function.

Microsoft

FROM PAGE 1

field testing until the fourth quarter and will ship in 1991.

At that point, Microsoft will be able to offer users a range of scalable servers, with LAN Manager running under OS/2, Unix, Digital Equipment Corp.'s VMS and IBM's MVS. Micro Tempus expects to deliver a VM version as well if users demand it.

Micro Tempus defended the timing of the announcement by explaining that it ties in with a separate product announced last week, The Enterprise Router, which is currently available. Chairman Larry De Boever said his customers, many of whom have multiple mainframes and hundreds of LANs, are in the process of making long-range plans to connect these pieces.

One such customer is Covia Partnership, which supports a huge mainframe site in Denver committed to the Apollo reservation system. Centralized remote network management, as well as host-based security, has grabbed the attention of Terry Porter, Covia's manager of technical system development.

"We have tremendous LAN management problems to solve in keeping LANs configured and doing remote trouble-shooting," he said. "I believe this will give us the ability from a central site to go poke around remote sites and distribute bug fixes and software, as well as let our travel agencies communicate between their various branches."

Porter also speculated that LAN Manager/MVS holds promise for Covia's network strategy. "We have a very layered architecture, and in some of our environments, we need the capacity to have massive servers. Perhaps we could time-share with customers."

However, several IBM mainframe users contacted about the announcement last week expressed ambivalence, given that many knew little about the products or how they would be used.

"I couldn't care less" about Microsoft's announcement, said John Good, manager of distribution systems at Turner Construction Corp. Turner expects to be almost entirely LAN-based in about a year. Good said that LAN Manager/MVS "may run in our system in some small, specific roles," for example, on an SQL server under OS/2.

Introduced in tandem with LAN Manager/MVS, The Enterprise Router uses the mainframe as an internetwork routing hub and bridges networks using existing Systems Network Architecture networks.

Micro Tempus executives claimed its router cuts costs on large systems where multiple links are built between various LANs attached to an MVS host. A better idea, the firm said, is to eliminate the redundant connections and send internetwork requests up through the host. All the user has to do is request a resource name; there is no need to learn any new commands. Other Enterprise Router features include remote administration of LAN Manager and Microsoft's Comm Server and centralized software distribution and remote access for SQL Server and other client/server applications.

West Coast Correspondent Jim Nash contributed to this report.

IS head moves out of systems

BY ELLIS BOOKER
CW STAFF

The de facto chief information officer at Ameritech has stepped out of information systems and been named vice-president of corporate strategies, *Computerworld* has learned.

James R. Heidenreich, 46, who joined Ameritech in January 1988 as vice-president of IS technology, assumed his new role at the beginning of this month.

One of the nation's seven regional Bell holding companies, Ameritech posted revenue of $10.2 billion in 1989.

In his new post, Heidenreich will continue to oversee IS activities, but his responsibilities will expand to include planning and reviewing the strategic development of Ameritech and its various business units. He will continue to report to Ameritech Executive Vice-President of Corporate Strategies Louis Rutiglinano.

Heidenreich *steps up from IS*

Implementation and management of IS at Ameritech, its five telephone operating companies, its cellular communications company and various other subsidiaries is handled by Ameritech Applied Technologies.

Formed in 1988, this group also markets information technology to the telecommunications industry. Glen Arnold is president of this group.

COMPUTERWORLD

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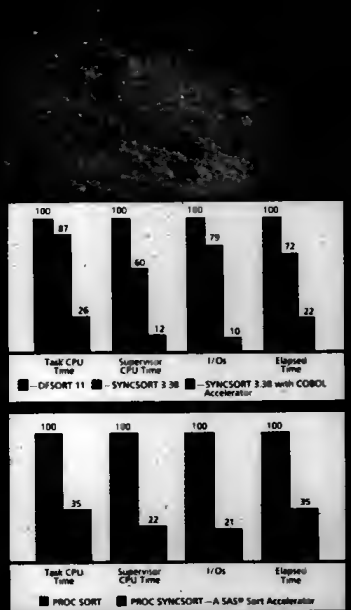

Bank's traders link in real-time

BY AMY CORTESE
CW STAFF

NEW YORK — Bankers Trust Co. ushered in a new decade of technology with the launch of a trading room designed to give traders in capital markets more control over the information they need to make critical buying and selling decisions.

The company announced last week that the new trading system, a joint effort between Bankers Trust and Digital Equipment Corp., was up and running at Broadgate, its European headquarters in London. The system automates a football field-size trading room equipped with DEC Microvaxes and 250 Decstation 3100s, which are used as trading stations and connected by a Decnet local-area network.

The launch marks the first stage of an ambitious long-range plan to automate and link the bank's trading operations worldwide, as well as the first production application using DEC's Dectrade, a software platform introduced several months ago as a foundation technology for financial industry projects. DEC is hoping the customizable Dectrade platform, which makes use of its Network Application Services, will help it win business with other financial institutions.

Bankers Trust *automates international trading rooms*

The new system replaces older analog technology with digital data distribution, providing 250 traders with real-time data from information providers such as Reuters and Quotron. In a business where seconds can mean a difference of millions of dollars, the digital-based system cuts response time from an average of nine seconds with the old system to one-fifth of a second.

The Broadgate system is considered to be one of the most large-scale implementations of digital data feeds. While most large institutions are moving to digital, the industry has generally been slow in adopting it, analysts said.

Unlike older video data feeds, information in digital form can be fed directly to a trader's workstation, where it can be analyzed with the help of spreadsheets and other applications running on the same screen. Broadgate traders now have one desktop device, the Decstation 3100, instead of the specialized data feed terminals and multiple personal computers required in the past.

Making it all back

Carl Vona, executive vice-president at Bankers Trust, declined to say how much his company invested in the project but said that the cost would be offset by savings resulting from increased trader productivity, the elimination of specialized terminals and new methods of pricing for electronic distribution of information. As a rule of thumb, Bankers Trust usually requires a 20% return on technology investments.

Dectrade is used as the technology platform for distributing information received from six information services. Dectrade's "multicast" capability allows every trader to receive information simultaneously with one transmission over the network, as opposed to the point-to-point transmissions typically used.

Bankers Trust chose to develop its own software on top of Dectrade for presenting and analyzing the data. However, a company could use Dectrade to integrate third-party applications in a real-time mode.

For instance, a trader could cut and paste information from one window running a spreadsheet program into another running a chart, regardless of who developed the application, as long as it is compliant with Dectrade.

Currently, Access Technology, Inc. supports Dectrade with its 20/20 real-time spreadsheet, and DEC claims that several other vendors are currently developing applications for it.

Lotus tools feed financial services to 1-2-3 on the fly

BY PATRICIA KEEFE
CW STAFF

CAMBRIDGE, Mass. — Lotus Development Corp. last week unwrapped a tool kit and software engine designed to allow users of real-time financial services to automatically access, feed and integrate multiple sources of data into 1-2-3 spreadsheets that run under OS/2.

"It's an excellent facility," said a beta test user at an East Coast financial institution. "We need to get data in real time, and with its smart server capability, we expect to bridge our internal host and external [data] feeds right into the workstation."

Direct links can be built to non-real-time data sources located on hosts or local-area networks using tools such as 1-2-3's Datalens.

"You can build a cooperative processing application that will allow you to crunch information back at the host simultaneously while processing real-time data on the spreadsheet via [this] cooperative link," the beta-test site user said.

A Lotus Realtime implementation consists of three components running on one box: one or more customized feed servers, a Lotus Realtime Engine and 1-2-3 Release 3.0 running under OS/2.

It will work with 1-2-3/G, Lotus' OS/2-based spreadsheet, when it becomes available. Product Manager Timothy Noonan conceded that a version of Lotus Realtime for Sun Microsystems, Inc. "makes sense" and is under "serious consideration."

Real-time translator

The Realtime tool kit, which costs $25,000, is used to build feed servers to hook up any source of real-time digital data. The "server" translates each data service's proprietary code into a standard format recognized by the Realtime Engine.

The Realtime Engine ranges in price from $475 to $1,350 per copy, depending upon volume purchased.

This engine maintains two-way communications with 1-2-3. It keeps a constantly updated "mirror" of all real-time data elements in the spreadsheet. Once each calculation is completed, the spreadsheet is automatically updated with the most recent data.

The system can run on an Intel Corp. 80286-based personal computer, but a pilot user and analysts recommend a 386 with at least 5M bytes of random-access memory and OS/2 1.1

Copyright suit hinges on design limitations

BY PATRICIA KEEFE
CW STAFF

BOSTON — Lotus Development Corp. kicked off its suit against Paperback International, Inc. and Mosaic Software last week with a convincing demonstration of the similarities that exist between its 1-2-3 spreadsheet and the two competing clones — Paperback's VP Planner and Mosaic's Twin.

However, Lotus founder Mitchell Kapor conceded many similarities common to 1-2-3, spreadsheet predecessor Visicalc and other spreadsheets. Under questioning Friday, Kapor classified as similarities various menu elements and the use of the '/' key to access various menu options.

At issue is not whether the defendants copied 1-2-3; they admit that. Lotus' attorney actually exhibited a 1-2-3 manual that he said the defendants used to check off features they planned to copy.

Instead, Judge Robert Keeton will have to decide whether there are certain functions required of all electronic spreadsheets, and whether the expression and implementation of those functions can be copyrighted.

Lotus claimed that 1-2-3 resulted from months of "intense effort to create, devise and organize," and that in particular, its user interface, menus and command structure can be copyrighted.

Lotus lead counsel Henry Gutman repeatedly referred to modern competitive spreadsheet examples — Excel from Microsoft Corp. and Quattro Pro from Borland International — as proof that spreadsheets can be compatible with Lotus, while sporting a significantly different "look and feel."

Gutman rejected the concept of a universal spreadsheet "metaphor." Paperback and Mosaic maintained that a spreadsheet metaphor does exist because market conditions require Lotus compatibility, and they insisted there are a limited number of ways in which to express spreadsheet functions. Paperback also noted a statement in a Lotus prospectus saying marketing is more key than copyright.

AT&T, Firestone sign network deal

BY ELLIS BOOKER
CW STAFF

AKRON, Ohio — Bridgestone/Firestone, Inc. last week became the latest customer to sign a Tariff 12 contract with AT&T for an integrated voice and data network, called Masterlink.

The three-year, multimillion-dollar deal calls for AT&T to link some 1,600 Mastercare Automotive Service Centers around the U.S. into the private network. Data from the automotive repair centers used to be sent to headquarters at night via dial-up lines, and voice communications were handled by conventional AT&T long-distance services.

As part of the new network, which is being deployed now and will be completed around the second quarter of 1991, Firestone will replace existing NCR 2950 point-of-sale devices with the AT&T Work Group System Center.

"We want our service centers to be the standard for the automotive industry," said Mastercare director of information services Tom Berns. To reach that goal, the new software-defined network will go far beyond the old network's simple point-of-sale operation. Linked to an IBM 3090 mainframe in Akron, the local centers will have on-line access to pricing, parts inventories and customer databases.

"Customers will be able to walk into any store and have the service records for their car," Berns said.

John Viher, manager of communication services at Bridgestone/Firestone, Inc., said the network is expected to save the firm 10% over its current communications services from AT&T and other providers.

Viher said a staff in Akron will manage the network of AT&T Paradyne modems and the pair of 56K bit/sec. circuits that will serve as Masterlink's backbone.

"From what I understand," Viher said, "our competitors are doing testing but have not installed anything as comprehensive as we'll have with Masterlink."

Intel hopes summit will cool DOS extender controversy

BY PATRICIA KEEFE
CW STAFF

SANTA CLARA, Calif. — Intel Corp. will host a summit this week in an effort to ice simmering developer resentment against Microsoft Corp.'s plans to snub the existing standard for DOS extenders in favor of a standard of its own tailored to the 80386 environment.

The meeting is expected to result in a discussion of technical issues and the formation of a DOS Protected Mode Interface (DPMI) standard committee.

Participants reportedly will include DOS extender developers such as Rational Systems, Inc., Quarterdeck Office Systems and Phar Lap Software, as well as microcomputer software developers such as Lotus Development Corp., Microsoft and IBM.

Intel's mediation is said to stem from concern that a battle over memory management standards might cool its red-hot sales of 386 systems.

The de facto standard implemented in today's DOS extender products is the Virtual Control Program Interface (VCPI), which lacks Intel and Microsoft support. Microsoft's DPMI proposal will manage DOS-extended applications running in virtualized protected mode under Microsoft's Windows/386, OS/2 and Unix.

Both techniques "extend" DOS memory to accommodate larger applications, but VCPI does not allow for virtualization nor was it designed to take advantage of multitasking, said J. Ben Williams, Rational's vice-president.

DPMI has created angst in the VCPI community because it could cost both developers and users plenty — there is no easy migration path between the two. Cambridge, Mass.-based Phar Lap reportedly is testing a driver that will allow VCPI applications to run under Windows/386.

In snubbing VCPI, some developers claim Microsoft is turning its back on hundreds of existing applications. "As many as a million users may need to replace their applications — at a tremendous cost [as a result]," Williams claimed. Most notably, Lotus' 1-2-3 Release 3.0 uses VCPI-compatible extenders. Lotus' 1-2-3 Release 3.0 cannot run under either the 386 version of Windows 2.0 or Windows 3.0's Enhanced Mode.

Rational Systems did announce support last week for DPMI but also called upon Microsoft to support the current standard. Microsoft had no comment.

U.S. office cited for IS shakeup

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — The U.S. Patent and Trademark Office (PTO) is on its way to turning an automation horror story into a success story, according to an advisory panel of information systems experts from the private sector.

Not long ago, the PTO's massive program to develop an automated system for patent searches and examinations was criticized as "gold-plated," poorly managed and plagued with cost overruns and schedule slippages [CW, March 6, 1989].

However, a just-released report by the advisory panel said that "dramatic improvements have been made in the automated patent system over the last 18 months." The same panel of experts criticized the PTO in a 1988 report that called for a management and technical overhaul.

The critique by the Industry Review Advisory Committee said that the PTO "has aggressively taken the key steps that can be done quickly and that bring the largest improvements." Furthermore, "top management has acted more swiftly than usual in such cases and is to be commended," the reviewers said.

The turnaround has been led by Thomas P. Giammo, appointed in mid-1988 as the PTO's top IS executive, and his deputy, Boyd Alexander. Giammo previously worked at the U.S. General Accounting Office, an agency that was one of the chief critics of the PTO automation program.

The panel praised the PTO for installing experienced managers, re-negotiating the systems integration contract with Planning Research Corp. in McLean, Va., and obtaining independent technical reviews from Mitre Corp., a federal contractor based in Bedford, Mass.

In addition, the PTO was commended for adopting the 1988 recommendation to abandon the "grand design" approach to systems development in favor of a more incremental approach.

However, the panel said that several essential and difficult improvements still need to be made. Primarily, the PTO should phase out its use of proprietary software in favor of open, modular software that complies with the SQL and X Window System standards and has standard interfaces. That way the PTO could replace current hardware and software with lower cost products, the report said.

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NEWS SHORTS

Apple could lose key pact

Apple Computer, Inc.'s largest sale to the federal government could be reversed under a General Accounting Office ruling that the Macintosh does not provide the multitasking requirements outlined in the contract. The $164 million contract to supply the U.S. Air Force with equipment was seen as a breakthrough in Apple's struggle to win acceptance in the lucrative government market. The GAO decided to reopen bidding following a protest by Martin Marietta Corp., a losing bidder.

Yale's Perlis dies

Alan J. Perlis, who helped to build the computer science programs at Yale University and Carnegie-Mellon University, died last week. Perlis, 67, was respected as a researcher in computer languages and as one of the industry's leading thinkers. During a 1989 colloquium on U.S. competitiveness, Perlis called computer-related technologies a vital asset for the U.S. He said that while military sponsorship of computer research has been valuable, it tends to channel development narrowly. He added, "It is inconceivable that we could function without the computer. Of course, we must not worship the machine as an idol, but we must domesticate it so that it serves both as a good and as a performer. The computer must be expected to play a role in almost every human activity."

Nynex nailed for overcharges

The Federal Communications Commission found Nynex Corp.'s operating companies guilty last week of overcharging their customers and hit them with a $1.4 million fine — the largest ever to be imposed on a telephone company. The FCC also ordered the companies to pay back $35 million to their customers. In a prepared statement, Nynex Chairman William C. Ferguson denied any intention of overcharging customers and questioned the validity of the rate-of-return regulations the FCC used as the basis for its ruling.

Retail output rises

The volume of personal computers sold through retail stores last year grew 22% over 1988 levels, according to a study by Audits & Surveys, Inc. in New York. IBM's Personal System/2 volume rose 35% in 1989, and the product family garnered an additional 4.3% of overall PC market share. But Apple Computer's Macintosh lost 0.2% of the market while growing in volume by 20.4%. Compaq Computer Corp.'s volume grew by nearly 35%, and the company gained 1.5% in market share.

Almost home

A year-long "fiber-to-the-curb" trial launched by New England Telephone Co. recently began in a Boston suburb to test voice efficiencies over fiber-optic cable in residences and small businesses. The test in Lynnfield, Mass., differs from other fiber trials, which run fiber-optic cable right into the home, in that it instead deploys the fiber loop to curbsides so that one fiber cable serves many customers. An electronic interface at the curb converts the optical signals to analog so that they can run from the curb to the home over traditional copper telephone wire.

Judge steps out of Apple case

The U.S. District Court judge overseeing Apple Computer's 2-year-old copyright suit against Microsoft Corp. and Hewlett-Packard Co. will hand over the reins when he heads for Washington, D.C., next month. Judge William W. Schwarzer will head the Federal Judicial Center beginning March 26, and his current duties will be taken up by Judge Vaughn Walker.

U.S.S.R. friendly

First, the big news was the opening of a McDonald's Corp. burger palace in Moscow. Now, a franchisee of Computerland Corp. will open the first computer store in the Soviet Union. Russian emigre Michael Tseytin, who now runs Computerland stores in Pennsylvania and New Jersey, will own the Moscow store.

More news shorts on page 119

Babes in high-tech toyland nabbed

BY MICHAEL ALEXANDER
CW STAFF

CHICAGO — The U.S. Justice Department escalated its war against computer crime last week with two indictments against members of an alleged computer hacker group, who are charged with stealing a copy of a 911 emergency computer program from Bellsouth Telephone Co., among several other crimes.

In a seven-count indictment returned in Chicago, Robert J. Riggs, 20, also known as "The Prophet," is alleged to have used a computer to steal a copy of a computer program owned and used by Bellsouth that controls emergency calls to the police, fire, ambulance and emergency services in cities throughout nine Southern states. According to the indictment, after Riggs stole the program — valued at $79,449 — he uploaded it to a computer bulletin board.

The Chicago indictment further alleges that Craig Neidorf, 19, also know as "Knight Lightning," downloaded the 911 program to his computer at the University of Missouri in Columbia, Mo., and edited it for publication in "Phrack," a newsletter for computer hackers.

Riggs and Neidorf allegedly intended to disclose the stolen information to other computer hackers so that they could unlawfully access and perhaps disrupt other 911 services, the Chicago indictment charged.

In a second indictment returned in Atlanta, Riggs and two others were charged with additional crimes related to Bellsouth systems.

All four hackers allegedly are members of the Legion of Doom, described in the indictments "as a closely knit group of about 15 computer hackers," in Georgia, Texas, Michigan and several other states.

Bellsouth spokesmen refused to say when or how the intrusion was detected or how a computer hacker was able to lift the highly sensitive and proprietary computer program.

"Hopefully, the government's action underscores that we do not intend to view this as the work of a mischievous prankster playing in a high-tech toyland," one spokesman said.

A source within Bellsouth said that much of what the hacker took was documentation and not source code. "They did not disrupt any emergency telephone service, and we are not aware of any impact on our customers," the source said.

William Cook, an assistant U.S. attorney in Chicago, declined to comment on whether 911 service was actually disrupted. "It is a matter of evidence," he said.

Cook also said that while the two hackers are charged with carrying out their scheme between December 1988 and February 1989, the indictment came after a year-long investigation. Though Cook refused to say how the hackers were discovered or caught, it is believed that after the initial penetration by one of the hackers, an intrusion task force was set up to monitor subsequent security breaches and to gather evidence against the hackers.

If convicted on all counts, Riggs faces a prison sentence of up to 32 years and a maximum fine of $222,000, and Neidorf faces a prison sentence of 31 years and a maximum fine of $122,000.

The Atlanta indictment charged Riggs, Adam E. Grant, 22, known as "The Urvil" and "Necron 99," and Franklin E. Darden Jr., 23, known as "The Leftist," with eight counts each of computer fraud, wire fraud, access-code fraud and interstate transportation of stolen property, among other crimes.

If convicted, each defendant faces up to five years imprisonment and a $250,000 fine on each count.

The three illegally accessed Bellsouth computers and obtained proprietary information that they distributed to other hackers, the indictment alleged.

Thief grief

Last week's disclosure of an alleged hacker theft of highly sensitive Bellsouth Telephone Co. documentation for a nine-state 911 emergency system was the second serious security breach of a telephone company network to come to light in as many months.

In January, a trio of hackers was able to penetrate computer systems at Pacific Bell Telephone Co. and eavesdrop on conversations and perpetrate other criminal acts [CW, Jan. 22].

Just how vulnerable are the nation's telephone systems to hacker attacks?

Spokesmen for Bellsouth and Pacific Bell insist that their systems are secure and that they and other telephone companies routinely assess their vulnerability to hackers.

"Security is being constantly changed, every intrusion is studied, passwords are changed," said Terry Johnson, manager of media relations for Bellsouth in Atlanta.

Johnson, however, declined to say how the hackers allegedly were able to lift the documentation to a 911 emergency communication services program.

"It is a rather serious computer security breach," said Richard Ichikawa, a Honolulu-based telecommunications consultant who specializes in designing and installing 911 emergency systems. Stealing documentation, as the Legion of Doom member is alleged to have done, may not be a particularly difficult task for a savvy hacker, he said.

Taking the actual program, while certainly possible, would be much more challenging, however. The computer that controls enhanced 911 service is "quite isolated" from the calling public, Ichikawa said.

A recently published report to Congress by the Office of Technology Assessment suggested that the security and survivability of the nation's communication infrastructure is at greater risk to hacker attacks than ever before. Business and government reliance on communications and information-based systems has increased, thus much more is at stake when those systems fail, the report stated.

The increased publicity of hacker attacks may help to curb attacks by hackers, said Sanford Sherizen, a security consultant at Data Security Systems, Inc. in Natick, Mass.

Some law enforcement officials complain that the nation's telephone firms do not cooperate as readily as they would expect when attacks of this sort occur. "They [telecommunications providers] are the single biggest headache law enforcers have right now," said Gail Thackery, Arizona state assistant district attorney.

Regional Bell operating companies contacted last week disputed that assertion.

MICHAEL ALEXANDER

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Hitachi floats 3390 counterpunch

BY JEAN S. BOZMAN
CW STAFF

SANTA CLARA, Calif. — Caught between the need to respond to IBM's 3390 disk drive announcement in November and the need to beat rival Amdahl Corp. to the punch, Hitachi Data Systems Corp. (HDS) last week announced its intention to market a 3390-compatible disk drive by year's end. The announcement fell short of a full disclosure of the capabilities of the new disk drive, called HDS 7390.

"It's a clear statement of our intent to deliver a product with those specifications," HDS spokesman Chuck Mulloy said. "But we'd rather hold back some information until we have everything in place. We're not disclosing the features that will differentiate our product from IBM's product." HDS also announced its intention to market a companion product, the 7490 tape-cartridge system.

HDS said its pricing was designed to be 95% of IBM's list prices, while HDS intends to match IBM's maintenance fees. However, the technological advances designed to allow HDS to outpace IBM's 3390 will remain undisclosed until this summer. Amdahl has yet to announce its own 3390-compatible product.

"It would be extremely impressive if HDS were able to ship a product within 12 months of IBM's Nov. 14 announcement of the IBM 3390," said David Vallente, vice-president of research for storage products at International Data Corp., a market research firm in Framingham, Mass. "At the logical level, their product would have to look to the IBM operating system like an IBM 3390, but they have some options in packaging such as doubling the capacity of a single disk drive."

Vallente noted that HDS' announcement came a week after Fujitsu Ltd. announced a new IBM 3390-compatible storage technology in Japan.

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IBM jazzes PS/2 with multimedia

BY PATRICIA KEEFE
CW STAFF

WHITE PLAINS, N.Y. — IBM brought multimedia to the Personal System/2 last week when it unveiled an adapter card said to allow users to combine full-motion color video, audio and still images with graphics and text. IBM also unwrapped software said to enable users to access and control a wide range of multimedia features.

The M-Motion Video Adapter/A receives analog signals from external video and audio sources, processes and digitizes them, sending them to a PS/2 monitor and external speaker, IBM said.

The M-Control Program is a tool kit that helps users create multimedia presentations with the adapter card. The adapter allows users to do the following:

- Change the size and position of still-frame pictures and motion video, superimpose graphics over video and view several different video images simultaneously on a PS/2 color monitor.
- Incorporate full-motion video on a PS/2 color monitor from a variety of sources, such as video discs, video cameras, videocassette recorders and closed-circuit television.
- Digitize and store music, voice or other sound input.

The M-Control Program runs under DOS or OS/2's Presentation Manager and allows users to control video and audio functions. It provides an architecture for interfacing with multiple hardware devices and software enablers, as well as a defined interface that allows users to attach up to three video sources.

Both products will be available in April. The adapter card costs $2,250; the software program costs $150.

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LAN management toolbox bare

As local nets become more mission-critical, users reveal crying need

BY ELISABETH HORWITT
CW STAFF

WASHINGTON, D.C. — While vendors ballyhooed their integrated network management platforms at last week's Communication Networks Conference and Exposition '90, users were complaining about one area that these platforms have yet to address: local-area network management.

"LAN-based computing is taking on more and more mission-critical jobs," which means that network managers "have assumed responsibility for the competitive success" of their companies, said Michael Kennedy, senior consultant at Arthur D. Little, Inc. in Cambridge, Mass.

However, the tools needed to help managers ensure success are scarce and sketchy, users at several Comnet sessions said.

Merrill Lynch & Co., for example, is working on how to ensure that users can reliably access the resources they need on a complex and constantly changing topology of interconnected LANs and hosts, according to John Cannie, senior systems manager at Merrill Lynch.

Troubleshooting issues are complicated by the fact that Merrill Lynch departments customarily enjoy full control and ownership of their LANs, but not all departments have experts to troubleshoot their own networks, he explained.

IBM's LAN Manager partially addresses this problem by collecting alerts and alarms from IBM Token-Ring bridges and sending them to Merrill Lynch's Netview hosts, where information systems managers can analyze the problem and notify departmental managers, Cannie said.

One drawback of the current LAN manager, however, is its lack of discrimination: "[It] has limited filtering. It sends all alerts and can flood the poor operator," Cannie said. However, IBM has informed Merrill Lynch that filtering will improve with the next version of the product, he added.

Merrill Lynch still faces the problem, however, of how to maintain users' access to various networked resources during frequent department relocations, Cannie said. One step in that direction is some software that IS has written that enables Netview to search out and display network resources, "no matter on what LAN," he added.

Managing moves and changes is also a key issue for those who manage Polaroid Corp.'s enterprisewide system of interconnected LANs, according to Colin Sledge, the Cambridge firm's network operations manager.

Sledge's biggest beef, however, seemed to be the lack of products that "measure performance on a hybrid network in terms that financial managers will understand," for purposes of accounting and cost-justification, he said. Polaroid's network is hybrid, encompassing a wide variety of workstations that communicate via Digital Equipment Corp.'s Decnet, Apple Computer, Inc.'s Appletalk, Transmission Control Protocol/Internet Protocol and Novell, Inc.'s Netware, he added.

Network managers at American President Companies Ltd. are also struggling to provide LAN performance and accounting statistics in terms relevant to top management, according to Brian Comnes, information center manager at the container transport firm. Business managers in charge of reviewing networking cost-performance still "think in terms of SNA and don't understand what's on the end of the wire," such as LANs, Comnes said.

LANs remain in users' hands even though American Presidents Line has moved some "mission-critical applications onto local-area networks, Comnes said.

Vendors respond

Vendors agree that it is high time to respond to user demands for better — specifically, more centralized — LAN management.

IBM, Digital Equipment Corp. and AT&T spokesmen all said their companies are talking actively with major LAN vendors such as 3Com Corp. and Novell, Inc. about the problem.

Here's a rundown of how leading vendors view user needs:

- William Gilbert, AT&T's recently appointed director of network management: What is missing are LAN-based "element management systems" that would generate the necessary management information and then send it to AT&T's Accumaster Integrator.
- Ellen Hancock, vice-president of IBM's communications systems division: "Customers have asked us to go beyond our current capability of remote management of LANs (via LAN Manager), so they can have buildings full of networks and not require anyone in the building to manage those lines."

Users have also requested better Netview support for Ethernet, and it is on the way, Hancock said.

- William Gassman, DEC network management marketing consultant: Users are demanding a LAN version of system management that would provide remote monitoring and control of server activities such as disk usage and user access of resources, configuration and fault management, and performance. In addition, users want an interactive link between their central management system and LAN systems, "so you get an alert when the server's disk is 90% full."

MITCH BETTS and ELISABETH HORWITT

Jackpot for IBM midrange

BY SALLY CUSACK
and ELISABETH HORWITT
CW STAFF

WASHINGTON, D.C. — As the dust clears, some of the biggest winners in the Communication Networks Conference and Exposition (Comnet) '90 product fallout may be IBM midrange system users.

GE Information Services is offering wide-area network capabilities to IBM Application System/400, System/36 and System/38 users by providing support for IBM's Advanced Peer-to-Peer Network (APPN) via a public-data network service. This is an industry first, the firm claimed.

The service reportedly extends IBM's AS/400 peer-to-peer network across long-distance X.25 links and will be available worldwide. "If you have the address of an [AS/400] node, you can access it across an X.25 network," said Donna Valtri, GE Information Services' manager of core systems.

GE Information Services also announced the second version of its Managed Network Services, which allows users to manage their portion of the company's public data network as if it were a private network.

The manager will reconfigure packet assembler/disassemblers and logical circuits, change password access and take users off a circuit, Valtri said.

On Sept. 19, IBM Information Network Services announced enhanced network services for management and communication between its midrange and 370 systems using Systems Network Architecture.

Eicon Technology Corp. announced the LAN Router/400, a software package that provides a local-area network gateway to the IBM AS/400 system. The product reportedly allows users on a LAN to run IBM AS/400 personal computer support and connect to an IBM AS/400 over X.25 networks or Synchronous Data Link Control lines.

LAN Router/400 is based on the LU6.2 protocol and offers total transparency to the user, the firm said.

U.S. Sprint Communications Co. announced LAN Reach to provide nationwide connectivity for LANs via the Sprintnet data network. The program will link distant networks and connect LANs to host computers or stand-alone PCs to form a single, enterprisewide network, the company said. LAN Reach supports X.25 and X.400 protocols.

In the initial phase of LAN Reach, Sprint has signed an agreement with Eicon Technology Corp. to resell Eicon's X.25/LAN gateway and bridge products.

Two step up to network management parade

BY ELISABETH HORWITT
CW STAFF

WASHINGTON, D.C. — Two more hopefuls elbowed their way into the already crowded network management industry at the Communication Networks Conference and Exposition (Comnet) '90 last week, announcing multivendor management systems with a slightly different twist from existing platforms.

Nynex Information Systems Solutions Group, Inc. emphasized that the Allink network management platform will provide users with management functions not only for whatever private networking equipment and systems they own, but also for the holding company's regulated local carrier side.

Westinghouse Communications Software, Inc. and Ameritech jointly introduced CMS II, which, at a starting cost of $150,000, is said to provide comprehensive voice/data network administration by adding a $150,000 data-oriented system to Westinghouse's existing CMS I voice administration product. It is also said to hook into real-time network performance monitoring systems.

Management call

Future management of New York Telephone Co. circuits was a major reason why National Westminster Bank of New York chose Nynex's Allink over competitors such as AT&T's Unified Network Management Architecture and IBM's Netview, according to Senior Vice-President Jeffrey Speight.

The bank is in the process of installing the first Allink module to be announced, Operations Coordinator, as a way to troubleshoot and monitor branch and back-office networks that incorporate a variety of vendor systems, including IBM Systems Network Architecture, according to Speight.

"We want the ability to get into the public network" and collect networking statistics, Speight added.

Over the next two years, Nynex will use a "superset of OSI management" functions to provide remote control, polling, configuration, administration, accounting and access control for local-, wide- and metropolitan-area networks, according to the Nynex division's vice-president, Gadd Selig.

Ford opts for Allink

Nynex also announced an agreement under which Ford Aerospace will use Allink as part of its systems integration services for the government sector.

CMS II is the first product to administer network changes and coordinate databases across various data network operations, such as inventory, user directories, trouble-ticketing and accounting, said Howard Anderson, managing director of Boston-based consulting firm The Yankee Group.

"I've got a dozen clients that will buy this very quickly," particularly among large companies "whose data traffic is growing 35% per year," Anderson said.

Ameritech Information Systems will be CMS II's exclusive distributor in the regional Bell operating company's region, the company said.

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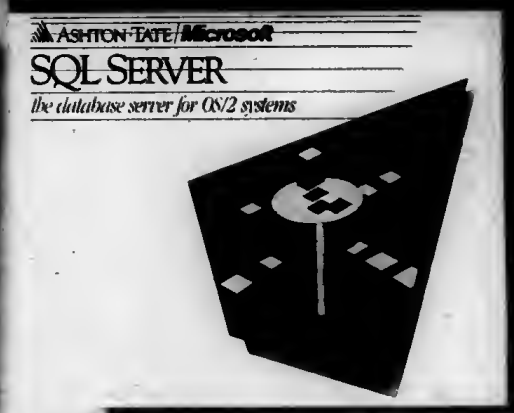

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Ashton-Tate SQL Server's published benchmarks show it to be slower.

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1990 Schedule

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Tuesday, March 13	Los Angeles
Friday, March 16	Denver
Tuesday, March 20	Minneapolis
Friday, March 23	Washington, DC
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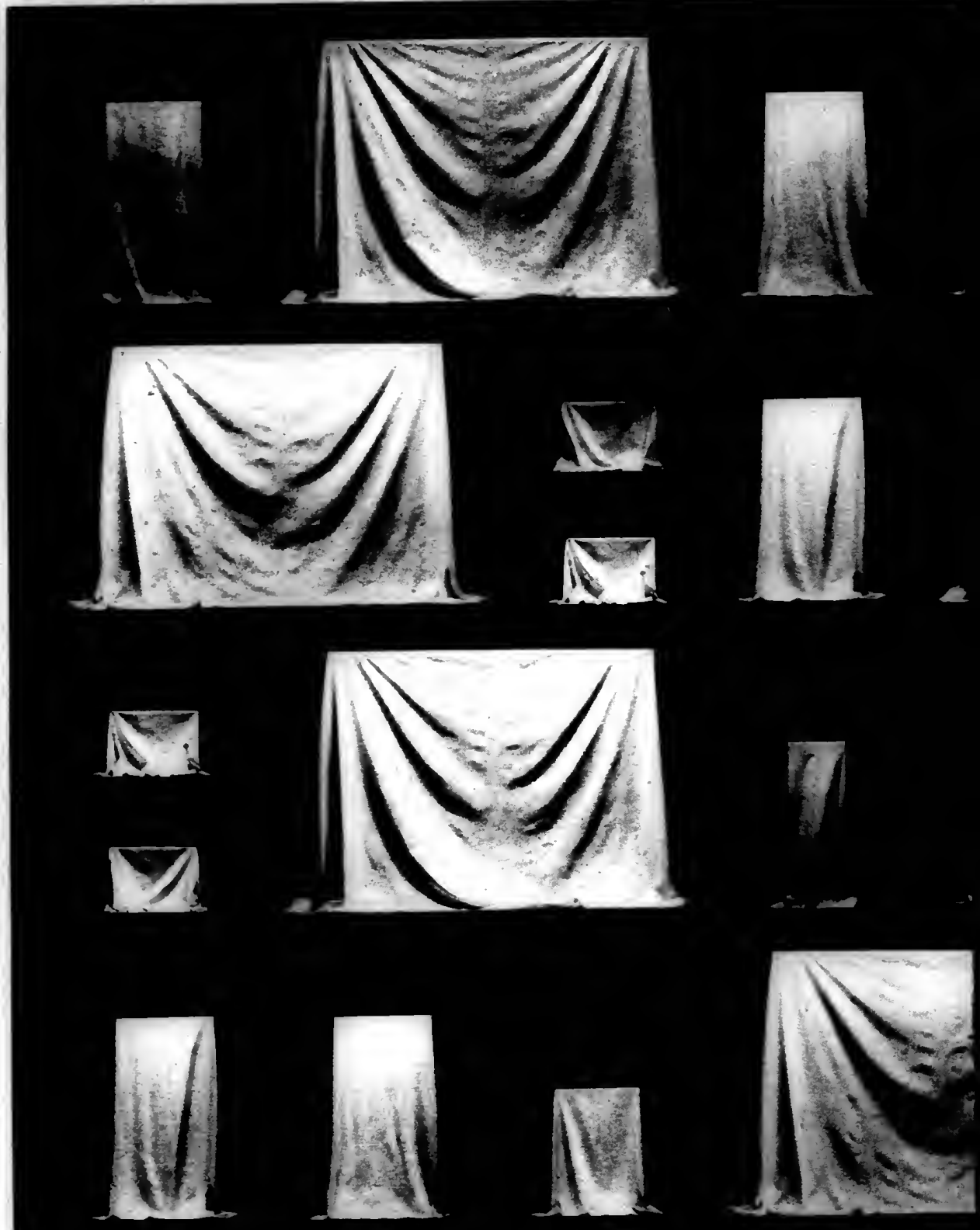

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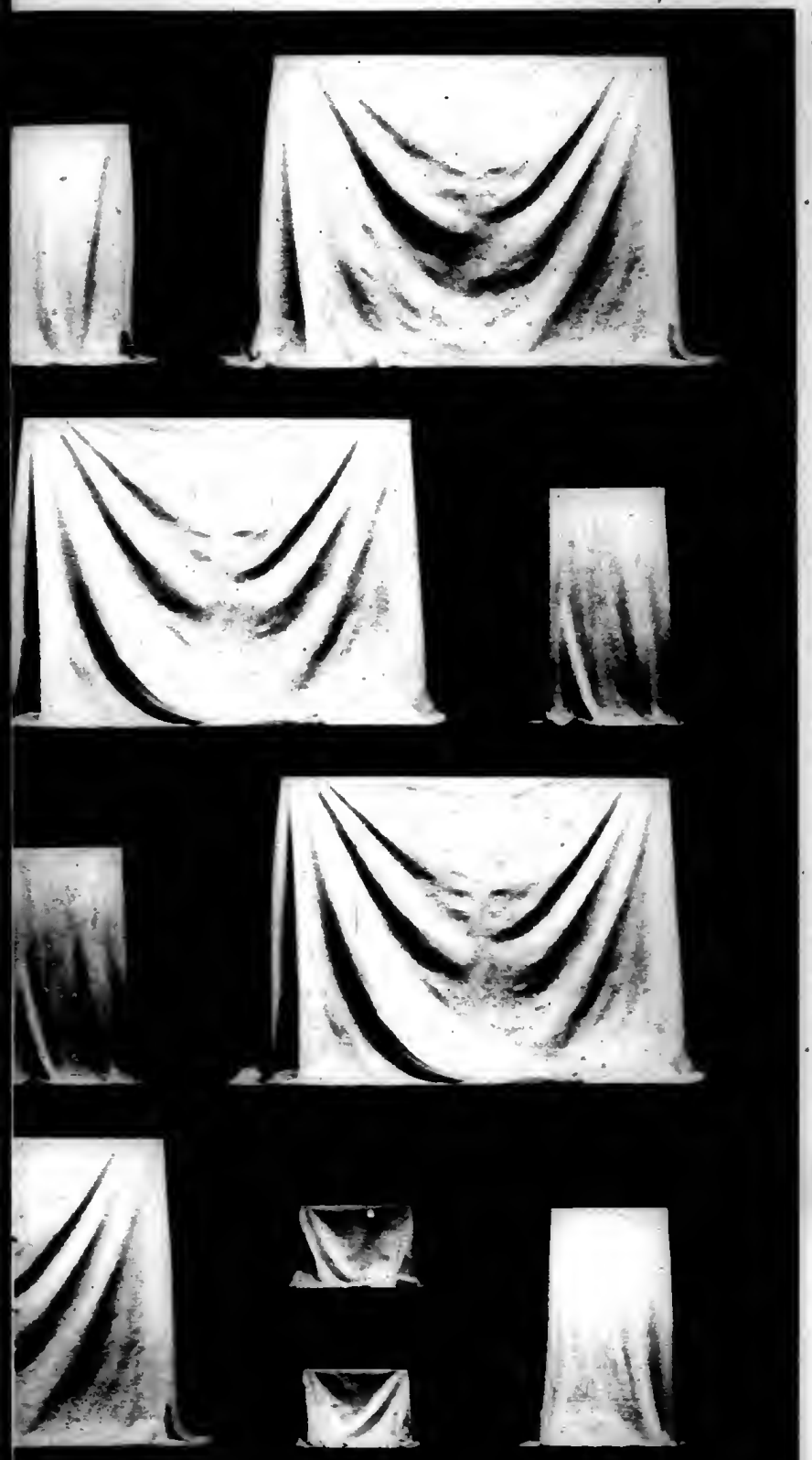

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Delta lands another CRS partnership

BY ALAN J. RYAN
CW STAFF

ATLANTA — After years of trying to climb out of its fifth and last-place slot in the airline computer reservation system (CRS) lineup, Delta Air Lines made some progress last week when it bought a 40% stake in a new CRS company.

The firm, called Worldspan Travel Agency Information Services, pairs Delta's Datas II CRS with Programmed Airline Reservation System (PARS), the industry's fourth-largest CRS, which is owned by Northwest Airlines and Trans World Airlines. Together, Worldspan will represent 26% of the U.S. travel agency marketplace, according to company officials.

Worldspan will operate autonomously of its airline owners, officials said last week, and will address both the domestic and international travel agency marketplace. Delta will hold a 40% stake in Worldspan, while Northwest and TWA will own 33.3% and 26.6%, respectively.

Last summer Delta made an unsuccessful attempt to merge Datas II with American Airlines's market-leading Sabre system. The U.S. Department of Justice thwarted the plan, vowing it would file a civil antitrust suit to block the proposed joint venture, which it said "would substantially lessen competition both in the sale of CRS services to travel agents and in the provision of scheduled airline passenger service."

At that time, the Justice Department's decision was praised by Northwest Airlines. "It was our position that a merger between the computerized reservation systems owned by Delta and American would have further restricted competition," a spokesman said last summer.

Last week, however, the Justice Department said it had no qualms about the merging of the fourth- and fifth-place CRSs. "After looking at this proposed merger, we decided there was no basis to challenge," a Justice Department spokesman said. "The antitrust division did not challenge the merger because the determination was made that it would not substantially reduce competition in the CRS sales and service market to travel agents."

Worldspan will be headed up by Chief Executive Officer Cal Rader, formerly vice-president of marketing automation at Delta in charge of Datas II. Efrain Zabala, former president of PARS Travel Information Systems, will be chief operating officer. Development of Worldspan will begin immediately, Rader said.

Why Experienced Computer Users Don't Think Very Much About Modems

Our research shows that knowledgeable MIS managers, PC coordinators, and end users simply don't want to think of modems at all.

Not exactly what modem makers relish hearing! But it's hardly surprising that you want to save your thinking for bigger and more important things.

Modems are a lot like plumbing. As long as the data is flowing, they're practically invisible. However, when something goes wrong, those little boxes are just lavished with anention.

By then, you've lost data, time, money, and perhaps an opportunity. Both senders and receivers are dismayed and disarrayed.

Fortunately, there are simple ways to limit this aggravation. Our research suggests a few points to keep in mind.

The cost of the modem is nnt the modem's cost.

The fixed price of the modem is relatively insignificant. Ongoing costs matter far more.

In the long run, for example, a high-speed modem can save you a small fortune on phone bills. More data sent in less time means less money to the phone company.

You can also save with more reliable and robust modems that communicate over a wide range of telephone line conditions.

Resending data costs both time and money. The less time you spend transmitting data, the more time you have to spend on your business.

Downtime and adaptation time can also cost you dearly.

Be sure to ask if the modems are compatible with their earlier generations. You don't want to start with suppliers who regularly obsolete their own products, or who don't offer you an upgrade path.

Modem support can be a real hassle with the wrong vendor.

Setting up and installing your modem can affect both your budget and your sanity. Many manufacturers forget to make their modems easy to use!

This becomes expensive when you want to start up fast or need to support a large number of users.

Dip switches, on-line help screens, and easy-to-use manuals should be demanded. It also helps to have a quick-reference guide printed on the bottom of the case.

In sticky situatinns, it's vital to have toll-free support and applications engineering.

**Bottom line:
The data must get through.**

A hit of data traveling from your computer is converted by your modem and sent to your local telephone office.

From there, it is exposed to the vagaries of phone lines, various transmission media, and weather patterns.

They all conspire to corrupt your data and slow down your throughput.

All modems are not created equal; some are less sensitive to noise and have better error-correcting protocols.

Some are simply more robust and have better filters.

Modems are more than mere commodities — technology does count.

"When things go wrong, I want the supplier there."

That's when you need the *right* supplier on board. Look for one who gives fast turnaround time on repairs and adjustments, and who doesn't vanish after the sale.

Look for a company with history and promise — one that's here today and here tomorrow.

Not everyone needs the same modem.

The best way to keep modems from wasting your time and money is to buy them from a reliable supplier with a broad product line. Those with limited lines sometimes try to cram square pegs into round holes.

People with differing applications have differing requirements. Dealing with a broad-line supplier simplifies ordering, reduces training/support time and cost, and limits hassle and coordination.

In the end, if you give enough consideration to choosing the right supplier, you'll hardly have to give modems any thought at all.

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CWD2/12/90

Oracle hooks up human resources

BY JEAN S. BOZMAN
CW STAFF

SAN MATEO, Calif. — Oracle Corp. added another tier last week to the layers of applications it is building on top of its Oracle relational database management system.

The human resources management program, Oracle Personnel, is part of the Oracle Financials group of products and is intended to complement existing Oracle applications flavors in the financial and manufacturing areas.

"There is a synergy between the Oracle applications packages and the Oracle DBMS," said Marc Hebert, director of vertical applications at Oracle. "They're positioned as a family. These applications products are opening new business for us and driving up sales of our DBMS, too."

The applications packages come at a high cost as well: Their prices can match that of the core Oracle RDBMS, Hebert said. Prices vary by machine size and type of computer platform used. He added there was a price range of $20,000 to $120,000 for Oracle Personnel.

Analysts said the pricing scheme was competitive with other human resources management offerings in the mainframe arena. "I think they're competitive with products from McCormack & Dodge and Management Science America (both firms now owned by Dun and Bradstreet) and from Integral Systems in Walnut Creek, Calif.," said Scott Smith, vice-president of research at Donaldson, Lufkin & Jenrette, Inc. in New York.

In its first release, Oracle Personnel is available for seven platforms: the Digital Equipment Corp. VAX, the Hewlett-Packard Co. HP 3000 and HP 9000, and systems from Data General Corp., Sequent Computers, Inc., Pyramid Computers, Inc. and Sun Microsystems, Inc.

Oracle Personnel uses form-driven queries to supply information about a company's employees. Data on salary level, security clearance, employment history and skills can be sorted by employee name or employee number. A series of Help menus guide users in manipulating the employee database. "Clipboard" windows can hold comments about employees describing their work performance.

Oracle Personnel is shipping to early-support customers and can be ordered immediately, Hebert said.

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32. Programmers, Software Developers
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23. Dir./Mgr. Sys. Development, Sys. Architecture
31. Mgrs., Supvr. of Programming, Software Dev.
32. Programmers, Software Developers
OTHER COMPANY MANAGEMENT
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12. Vice President, Asst. VP
13. Treasurer, Controller, Financial Officer
41. Engineering, Scientific, R&D, Tech. Mgt.
51. Sales & Mktg. Management
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ADVANCED TECHNOLOGY

And the password is: 'Obsolete'

BY MICHAEL ALEXANDER
CW STAFF

Are memorized computer security passwords passe? Quite a few computer scientists and security experts believe so.

"I predict that within five years, most systems will have a higher level of security beyond simple password protection than exists today," says Doug McIlroy, one of Bell Laboratories' top computer scientists. He envisions that computer systems will be protected by some form of password calculating device — mainly, a combination of decoder box and key.

There are basically three types of these devices now on the market, according to Harold Highland, a respected computer security expert.

The first is a plain credit card with a magnetic stripe; the second is a smart card with a built-in microprocessor; and the third is a token, which typically looks like a pocket calculator, complete with buttons and LCD.

With the token system, the user "owns" the token after it has been assigned a personal identification number, like that used to operate an automatic teller machine. The token works in sync with software loaded on any system, from laptops to mainframes. Operating a token-based system is simple: The user enters his log-on identification into the handheld device, the computer responds with a challenge and asks for a password, and the user responds.

Highland said he prefers this "question-response technique" because the challenge and password changes with each access and is virtually foolproof.

There are bound to be systems for which the usual password protections will be adequate, and systems administrators are apt to become more active in teaching end users how to create and protect their passwords. Some suggestions from Highland follow:

- Set a minimum of characters (at least eight) for a password to keep users from creating simple two-, three- and four-character passwords that are easy to divine.
- Pick a word in English and then use a foreign translation culled from a translation dictionary.
- Use a password phrase instead of a one-word password.

Pulling more memory out of a disk

A stack of small, low-cost disks could be an inexpensive solution to storage problems

BY MICHAEL ALEXANDER
CW STAFF

David Sheldon

With the dizzying pace of innovation in computer processor speed and memory capacity, it is easy to overlook the fact that hard disk drives and other peripherals have fallen behind the pace. Now, considerably more attention is being given to finding ways of making data-storage devices, particularly hard disk drives, catch up with computers.

One idea that is picking up steam is the "disk array," a stack of several inexpensive, 3½- or 5¼-in. hard disks on a single spindle.

Disk arrays potentially could replace large drives now in use, some experts have predicted. Not only do small disks spin faster and retrieve data more quickly than large drives, but they are also inexpensive by today's standards.

The stacked drives are still experimental, but interest in them is mounting because the cost of 3½- and 5¼-in. hard disk drives has fallen dramatically in recent years. Already, several small disk drives are cheaper than a single large one.

"It's a cheap way of mass storage," said Michael Foster, program director for experimental systems at the National Science Foundation. "These are hugely mass-produced small disks, and if you were to put them all together you could do the same thing as a single large drive at more megabytes per dollar."

For example, an array of hard disks would cost about half as much as a single platter drive, he said. "It would be possible to put one of these together for $20,000 to $23,000 at OEM pricing and sell it for about $60,000." In comparison, a large data-storage disk of comparable capacity, which ranges between eight and 14 inches in diameter, costs as much as $120,000.

Flaw in the array

Disk arrays, however, are not without flaws. With more disks in operation, more can go wrong.

"The main problem is one of reliability," Foster said. The mean-time-to-failure rate of several small disks in an array is high, he said: "The main technical problem is to code data so that the failure of one or two drives would not bring the whole system down."

But Jim Porter, president of Disk/Trend, Inc., a market researcher based in Mountainview, Calif., disagreed. Today's smaller disk drives are extremely reliable, he said. The mean time before failure in low-end disk drives is more than 150,000 hours, up from 10,000 hours only a few years ago.

Still, disk arrays come with the usual good news/bad news story, according to Porter. The good news is that "there is a very high assurance of data not being lost; you can achieve high transfer rates and they can be cost-effective."

The bad news stems from how disk arrays operate. In an array, data may be packed onto a single disk, but most often it is scattered or "striped" across several disks at the same time. Should one or more disks fail while data is being recorded, information could be lost.

To guard against that, disk arrays have a certain amount of redundancy built in, thus making them more expensive than appears at first, Porter said. "Where it is required that you have 4G bytes of storage means you must have 5G bytes of disks," he said.

THE STACKED DRIVES are still experimental, but interest in them is mounting because the cost of 3.5- and 5.25-in. hard disk drives has fallen dramatically in recent years. Already, several of the small disk drives are cheaper than a single large one.

For now, disk arrays are aimed at the supercomputer, mainframe and minicomputer markets for use in automated teller machines, storewide point-of-purchase systems and other transaction-intensive operations. Porter and other analysts believe that within the next few years, disk arrays will become widely used in file servers in personal computer networks.

Compaq Computer Corp. introduced a file server with a disk array late last year that Porter said would trigger a rush by other PC vendors to develop disk arrays to compete. "The Compaq System Pro announcement, which is a file server with four or five drives, has turned Compaq's competitors on their ears," Porter said.

Several companies are exploring disk array technology. Among them are IBM, Tandem Computers, Inc., Amdahl Corp. and Storage Technology Corp., among others. Foster said that IBM has been working on the problem for several years.

Whether disk arrays are the storage medium of the long-term future is certainly arguable. There are several alternative storage media that may fill the same need, said Mike Morris, an analyst at International Data Corp. in Washington, D.C.

The growing popularity of image processing, which requires considerable data storage capacity, is driving erasable optical discs, digital paper and other storage media, he said. The idea of stacking hard disk drives could also be carried over to stacking optical drives to accomplish similar aims, he said.

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EDITORIAL

Mixed emotions

SPURRED BY THE recent collapse of U.S. Memories — the chip consortium — and by the general malaise of the computer industry, considerable attention is being paid to the debate over a federal high-tech policy, as in "do we need one?"

The implication in the ongoing debate is that someone, somewhere, has already drafted a policy with which at least some people agree. This is not true, nor is it true that any cogent and consistent arguments against the implementation of a policy have been developed.

In simplified terms, we have the pro-policy group composed of U.S.-based companies (the *based* part is critical) arguing for some combination of direct federal financial support and modified trade policies. The no-policy camp is headed by chief White House mouthpiece John Sununu as well as budget-watchers within the Bush administration.

On one hand, the latter group is the only one making any sense. On the other hand, this same group of laissez-faire enthusiasts is offering painfully little in the way of addressing the very real problems that are driving the pro-policy group.

The major flaw with the pro-policy argument is that it doesn't acknowledge fundamental changes in the global economy. The same companies seeking federal help are often companies making their largest investments abroad, in offshore factories and in the people who operate them. How about the foreign-owned companies investing in plants in this country, plants operated by U.S. workers? Which deserves federal help the most?

Instead of pushing for protectionism or corporate welfare, why not push for laws that rein in the absurd leveraged buyouts and corporate raiding that have created a climate in which management increasingly focuses on the short-term view at the expense of long-term planning? Why not push for clearly defined trade policies that demand swift penalties for European nations as well as Japan when those governments toss up blatantly protectionist practices?

In fact, the direction any federal policy should take is addressed very well in a recent article in the *Harvard Business Review* written by Harvard professor Robert Reich. Read this excerpt while bearing in mind that, in a just-released survey of high school students around the country, 13% could not locate Canada on a map and one in four had no idea where Latin America is. Reich writes:

If we hope to revitalize the competitive performance of the United States economy, we must invest in people, not in nationally defined corporations. We must open our borders to investors from around the world rather than favoring companies that may simply fly the U.S. flag. And government policies should promote human capital in this country rather than assuming that American corporations will invest on "our" behalf.

LETTERS TO THE EDITOR

Wrong founder

We were pleased to read "APL poised to move beyond its small, but loyal, coterie" [CW, Oct. 2, 1989] and to be mentioned in the accompanying sidebar "A language classic." However, I. P. Sharp Associates Ltd. was founded by Ian P. Sharp and seven colleagues in 1964 and not by Kenneth Iverson as attributed in your article.

Dr. Iverson did create APL and contributed greatly to the development of Sharp APL while with I. P. Sharp from 1980 until his retirement in 1987.

Irene Shimoda
Corporate Relations Executive
I. P. Sharp
Toronto

Reference error

I read with interest an article produced by Bob Stahl entitled "Packing your testing tool box" [CW, Oct. 9, 1989]. Since I collaborated with Stahl on the technical content of this article, I was surprised to find that one of my quotes was reduced to "One vendor offered this advice: 'Know the mechanics of testing inside out before you look at tools. Then use the 30-day trial period most vendors offer you. Many sites waste this period becoming familiar with the tool. Do that first, and use the trial period to try it out on your own production work.' "

The quote is accurate; however, in reducing our specific reference to "one vendor," a gross assumption was made — that we were a vendor, which we are not. Software Quality Engineering is an educational and consulting organization that specializes in software quality engineering, assurance, management and testing. We also produce a reference source called The Testing Tools Reference Guide and maintain an active database of over 800 test tools.

Jerry E. Durant
Senior Technical Associate
Test Automation Technology
Software Quality Engineering
Jacksonville, Fla.

Put children first

Regarding Glenn Rifkin's Viewpoint column entitled "It's time to make room for baby" [CW, Dec. 11, 1989], in which you state that work and family are equally important, rest assured that there is no job or career that is anywhere near as important as raising your child.

Unfortunately, many in the "childbearing-age" have lost sight of the importance of parents caring for their own children. They also believe that work is equally important. I agree that business must address the issue of dependent care, but it is much more important that couples today relearn the value of putting one career on hold, and giving up some material goods, for their children's sake.

I realize that there are many families in which both parents must work just to make ends meet. If you and your wife are not in this situation, however, I urge you to get your "sense of fulfillment and happiness" from having one of you there with your child all day. In just a short five years, your child will be in school full-time, and you or your wife will again be able to spend more time on your career.

Glenn Boylan
Westinghouse Environmental and Geotechnical Services, Inc.
Atlanta

Handing off baby

Regarding Glenn Rifkin's column "It's time to make room for baby" [CW, Dec. 11, 1989], how can an information systems professional, or any professional, outsource the care of a newly born infant as if it were another budgetary control strategy similar to Kodak's outsourcing of its data processing operations? Why don't we let the 6-month-old infant choose if he or she would prefer to be raised by his own mother or by a child-care outsourcing vendor? Must our IS industry wives all become quarterbacks who simply hand off their infants like footballs to the employer-sponsored child-care departments so their mothers can look for self-fulfillment on the job somewhere?

Why must we destroy the image of June from *Leave It to Beaver* as if being a vice-president were something more important, worthwhile or self-fulfilling to her? The real problem facing the IS industry in this new decade is the further destruction of the family life and the moral fabric and stability it provides to our self-fulfillment. If we do continue in this way by destroying traditional child care, it really will not matter how high the computer industry stocks go, because there will be nobody home to share it with after work.

R. Eddings
Systems Analyst
Switzerland

Computerworld *welcomes comments from its readers. Address all letters to Bill Laberis, Editor,* Computerworld, *P.O. Box 9171, 375 Cochituate Road, Framingham, Mass. 01701. Fax: (508) 875-8931; MCI Mail: COMPUTERWORLD.*

Fixing the house that IS built

ROBERT M. THACKER

What kind of house are we trying to build, anyhow?

You have decided to remodel your home. Your reasons are cost-justified, you believe, by the expected appreciation and efficiencies that are achievable through newer appliances, heating, ventilation and air-conditioning systems and structural materials. Furthermore, you would like to accommodate the changing lifestyle brought on by three growing teenagers and a two-income family. You assign rooms to each family member and allow each to "do his own thing." Each member works independently to design the rooms assigned to him or her.

Later, you get together to discuss finances and what portion of the budget will be allocated for each room. Without further ado, you tell all family members to hire architects and contractors to redesign and remodel the rooms assigned to them.

After a few months your house is in a state of disarray. Operating costs are out of control. Upon closer inspection you find that everyone has literally designed and built their own house — within your house. Everyone has acquired redundant utilities and amenities.

Architecturally, your home is the talk of the neighborhood. It is a cross between a Contemporary, French Provincial, Elizabethan and Colonial. You are going bankrupt, getting a divorce, and you're now stuck with a house that is barely inhabitable, highly dysfunctional and probably unsellable.

Thacker is president of Thacker & Associates, a computer-integrated enterprise consultancy in Boca Raton, Fla.

Deja vu

"A bit out of the ordinary, sounds preposterous, never could happen," you say? The fact is, this scenario has been played out over and over again in many U.S. companies. As we have attempted to renovate companies through the unplanned, uncoordinated, incremental implementation of computer and automation technology, we have built companies that are inefficient, redundant and burdened by systems that do not communicate with one another.

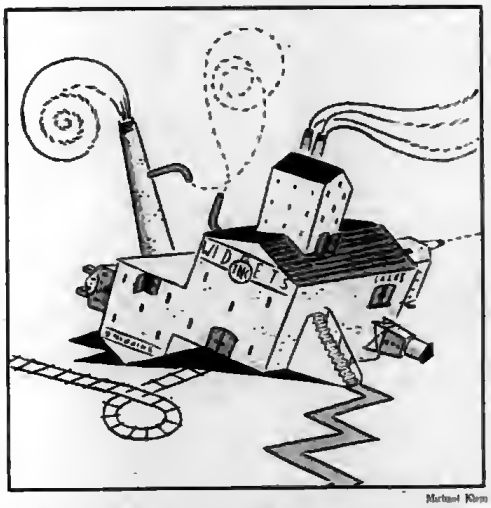
It is as if each business function attempts to design the most efficient system for its needs but forgets that it must coordinate with the other business functions. It is as if each function is building a separate house within the company.

If we define computer integration in terms of the whole enterprise, then we must focus on the cycle of creating ideas for new products, planning for and controlling those ideas, moving those ideas toward productive actions and finally selling and distributing products in a timely fashion. We must look at the process as a whole.

Through the introduction of holistic concepts and practices, such as just-in-time, computer-integrated manufacturing or enterprise integration, we have begun to realize the detrimental effects of unintegrated management, function, personnel and technology on our ability to compete in the world marketplace.

We have also realized that incremental computerization and the interfacing of individual functions, such as engineering and manufacturing, have not given us the overall optimized productivity and profitability we expected.

Since the problem of computer integration is so complex and the integration of each business function impacts the whole, it seems only logical that we conceptually model what we want to look like after we have integrated and implemented technology.



Michael Klein

What seems to be missing is a conceptual reference model of our computer-integrated enterprise. A model could be built by executives, middle management and personnel, all of whom would participate in creating a common vision of how they would use computer and automation technology to establish and maintain a competitive edge.

Instead of being swayed or confused by "silver-tongued" marketers selling hardware and software under the guise of computer integration, we should focus on our own conceptual architecture for integration. By developing our own integrated reference model, we will be able to see that many computer vendors lack the conceptual architecture, logical software and physical hardware solutions necessary to integrate and optimize our unique company. Because we hold the "vision" of the integrated whole, we control our destiny and are less apt to buy solutions that can't be integrated. Each business entity, as it attempts to optimize its individual function, can refer to the model to ensure that the proposed solution can be integrated.

The implementation of computer and automation technology will tremendously enhance or inhibit our present and future productivity and profitability. The focus of such modeling should be on how we managerially and functionally organize ourselves to use technology to optimize the flow of ideas into controlled, productive actions. How well we conceptually visualize, logically plan and control as well as physically integrate this technology into our existing companies will determine our economic viability.

By jointly building a conceptual computer-integrated enterprise model, we facilitate the synergy, cooperation and integrated thinking and actions that are so essential to our economic survival. Once an integrated model is built, we will know what the house will look like before we attempt to renovate it.

PC user groups: The ship has come in at full steam

JOE RIGO

If nothing else, Comdex/Fall '89 proved that personal computer user groups have become part of the information systems establishment.

I'm a member of the New York PC Users Group (NYPC). In 1982, Lotus wouldn't even take our phone calls. It thought we were just a bunch of software pirates. However, at this last Comdex show, I grabbed its chairman, Jim Manzi, and he said, "Sure, I'll talk to your group. Call my office, and we'll set up a date."

This was just one incident in a week filled with welcomes for the more than 300 user group officers attending the show in Las Vegas.

Peter Norton fed us breakfast and demonstrated his new disk backup program. Poquet Computer's Stav Prodromu bought lunch and raffled off one of his coat pocket marvels. Bill Gates soberly shook our hands in the evening while we gobbled Microsoft food and beverages.

At another breakfast session, Intel Chairman Andrew Grove forecast the hardware scene for the next 10 years. Logitech showed its product line at lunch, gave each of us a clear plastic mouse, and let us know it would love to repeat its talk at our membership meetings. For dinner, Wordperfect rented a room at the top of Bally's so our newsletter editors could eat and commune for four hours.

The Comdex activities were arranged by Jerry Schneider, former president of the Capital PC User Group, who has organized the Association of PC User Groups. Vendors like the association because they hope it will help them communicate with the more than 5,000 DOS, Apple, Tandy and other user groups in the U.S. and Canada.

Vendors can make big sales to corporate clients with a single stop, but it's still only a fraction of the market. User groups help them reach new audiences.

For example, the New York group's membership includes nuclear physicists, Chinese language scholars, filmmakers and hundreds of small businesses, as well as computer nerds from the user departments of the major television networks, clothing manufacturers and Wall Street brokerages. A meeting can pull all these people together in a single room to hear an industry celebrity or watch a product demonstration.

However, there are some clouds in the vendor/group relationship. An editor of a personal computer magazine complained at one Comdex meeting that user groups are too "gimme, gimme, gimme." He had probably just watched us go through one of those meals.

Moreover, he has a point. Peter Norton talked to our group last spring, and after the meeting, one member followed him all the way out to his car trying to bum free software from him. Sorry, Peter.

On the other hand, most user groups are run by unpaid volunteers. We do it for our own bizarre reasons, which do not include making money. We count on vendors to donate computers for our on-line bulletin boards, printers for our newsletter copy and software for our membership drive raffles.

Rigo is president of Sysdoc, Inc. in New York and former president of the New York PC Users Group.

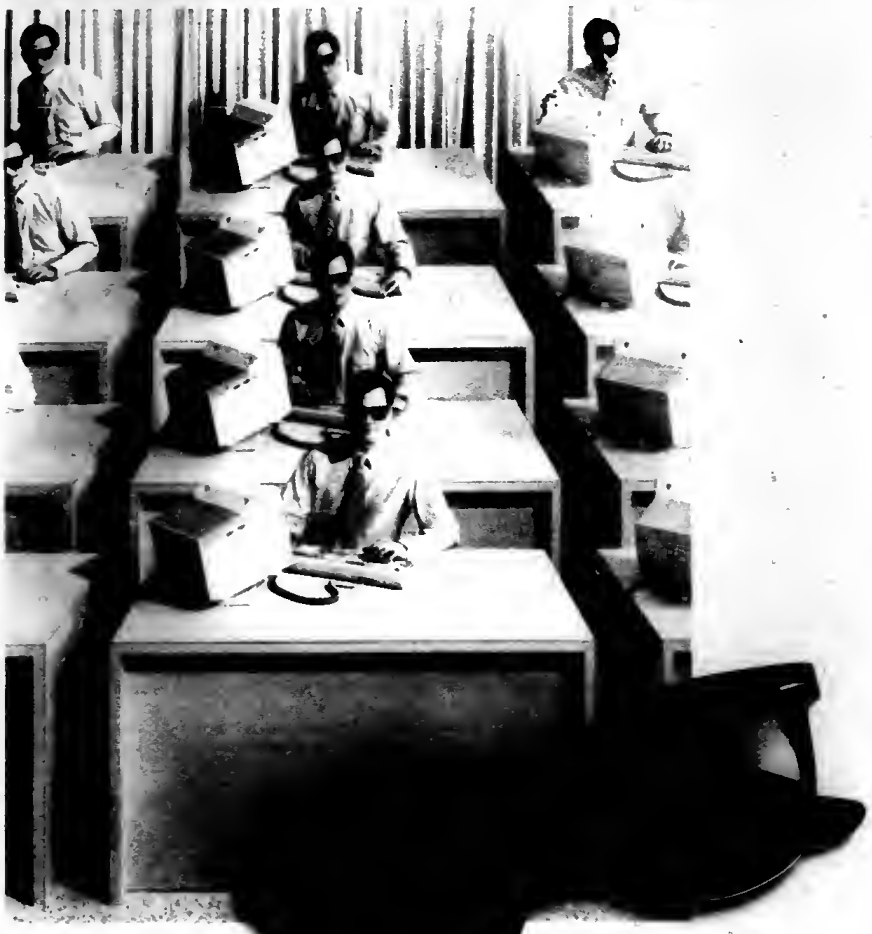
Solicitation pros

Some of us are becoming experts in the art of solicitation. Leaders of the Boston Computer Society met before the last Comdex, decided what donations they needed and charged each person going to the show with getting one of the items.

On the other hand, it's only fair. The vendors use us to sell their products. Some magazines even offer subscription discounts to user group members. It was their idea — we didn't have to ask.

NYPC's speaker list in 1989 included Bill Gates, Peter Norton, Adam Osborne, Rod Canion of Compaq, Charles Wang of Computer Associates, Jim Cannavino of IBM, Esther Dyson and columnist John Dvorak. Clearly these people and companies now believe that user groups are good business.

TRUER BLUE.



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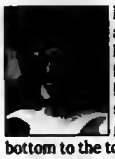
HARD TALK

Jean S. Bozman

Seamlessness shows seams



Hewlett-Packard says that it has found a way for users to painlessly and seamlessly upgrade from the bottom to the top of their HP computer line without requiring a box swap.

That news came last month at the HP press conference, where the company introduced 24 processors to its minicomputer line. But many of the computers introduced aren't exotic extensions to the line, new from the ground up. Instead, many are additions to the existing HP 3000 line, which runs the proprietary MPE operating system, and to the HP 9000 line, which runs HP's version of AT&T's Unix System V.

The gradations in those lines are now achieved through a number of board-level upgrades. Users can add these boards, which contain HP's reduced instruction set computing (RISC) chips, as a quick way to step though the power levels in each computer line. HP, it seems, is leveraging its current lead in homegrown RISC technology to compete against computer vendors No. 1 and No. 2 — namely, IBM and DEC.

Continued on page 28

VAX users welcome automation

ISA Solutions' automated operations tools boost VAX's sophistication

BY ROBERT MORAN
CW STAFF

Early users of ISA Solutions' automated operations software say the new tools provide mainframe sophistication in their Digital Equipment Corp. VAX/VMS installations.

ISA, based in Skokie, Ill., introduced ISA/Taskmaster, ISA/Netmaster, ISA/Sysmaster and ISA/Responsemaster. The four components of automated operations software were built two years ago for a few large corporations and became generally available in October 1989.

ISA/Taskmaster, an automated job scheduler, allows users to schedule tasks by time or interval to build job schedules with complex task dependencies.

Beta-test site user Stephanie Schaefer, MIS director of HMO America, Inc. in Chicago, runs ISA/Taskmaster on four VAX processors — a VAX 6410, VAX 8800 and two VAX 8350s.

HMO America schedules its processes to run in batch from 5 p.m. to 8 a.m. "With Taskmaster, we can schedule the jobs in advance and put in specifics such as this can't run unless these two jobs ran without errors," she said. "Taskmaster creates its own logs and will notify you at home if there is a problem and it can't go to the next batch process."

Schaefer said the product combats the turnover rate for operators. "It takes a long time to retrain new operators on how our applications run," she said. "With Taskmaster, that isn't necessary, because all you have to do is push a button."

'Hi, this is your VAX'

ISA/Netmaster permits automatic out-dialing between Decnet links and remote VAX systems and allows organizations to run applications on remote non-VAX systems from command scripts on a VAX.

In contrast, Decnet supports automatic answering but not automatic dial-out, ISA President Irv Shapiro said. He said other products use proprietary protocols and are not integrated with the Digital Network Architecture.

Michael Artukovich, systems support supervisor at Health and Tennis Corp. of America, a health club holding company in Los Angeles, uses ISA/Netmaster to automate the task of dialing 300 Microvaxes to update membership databases on a VAX 8530. Artukovich said the company has been using the software for about two years.

"There is very little configuration necessary," he said. "The package dials a particular Microvax, forms an asynchronous link, and then we just run command procedures to run data back and forth across the network."

In addition, the company uses ISA/Netmaster and ISA/Taskmaster to enter payroll in regional offices. "We schedule the jobs in Taskmaster every couple of days, and the operators kick jobs off through a Taskmaster menu," Artukovich said. "If you have to do a lot of uploading of files from remote sites and poll a lot of sites, the packages make life so much easier."

ISA/Sysmaster, a monitoring and reporting tool, monitors disk space, print queues, systems parameters and CPU resources used at specified intervals.

According to Kathie Loose, systems manager at Alcoa Davenport Works in Davenport, Ill., "Sysmaster has been a helpful proactive tool" on the company's multiple VAXs.

According to Shapiro, DEC's performance monitoring software can identify but cannot correct problems. Loose said that DEC's VAX Console, for example, could only notify the systems manager of a paging problem, while ISA/Sysmaster could correct the problem.

Intel enlists Multiflow for parallel computer

BY ROSEMARY HAMILTON
CW STAFF

It appears that Intel Corp. would like to take the team approach to the minisupercomputer business.

The company is scheduled to announce a deal today with Multiflow Computer, Inc. that will give it access to Multiflow's compiler designed for parallel computing. Just a few months ago, the company signed a similar but more wide-ranging deal with Alliant Computer Systems Corp., a Multiflow competitor.

The Multiflow deal, which will cost Intel at least $4 million, complements the deal with Alliant, according to Multiflow officials. While the Alliant technology governs higher level aspects of parallelism, the Multiflow technology is concerned with instruction-level processes.

However, Intel does not have a sure bet that Multiflow will join the team of companies that use its I860 reduced instruction set computing microprocessor. Multiflow said last week it had no immediate plans to base future systems on that chip.

Instead, firm officials seemed more concerned with the release of a new high-end system, codenamed Mercury, which the firm said will be a supercomputer in the class of Cray Research, Inc. systems. Multiflow said the system, based on its emitter coupled logic technology, will be introduced later this year.

Inside

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- Storage and communications presents for Tandem's CLX line. Page 25.
- CA adds another brick to its Unipack wall. Page 28.

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SOFT TALK

Sam Albert

Proprietary openness

IBM has trumpeted the values of its Systems Application Architecture (SAA) loud and clear, and it isn't all proprietary as in the past. At the same time, however, the company has provided two clear signs that it recognizes the new realities of open systems and multiple-vendor computing environments.

First, SAA is probably the most "open" proprietary strategy released by IBM since it delivered the original Personal Computer. SAA is open in the sense that it relies on open interfaces that have been adopted by many computing vendors. In addition, IBM publishes the SAA interfaces and protocols and encourages their use by third-party developers.

The second sign is IBM's major investment in its own version of Unix, Advanced Interactive Executive, better known as AIX. Rather than signifying a battle between open and proprietary systems, as some perceive, IBM's offerings of SAA and AIX are alternative platforms that show the company recognizes the need to provide multiple levels of nonproprietary systems.

While SAA provides for consistency of operating systems and applications across the four major IBM hardware platforms, AIX furnishes similar functions across three platforms: System/370 mainframes, reduced instruction set computing-based midrange computers and Intel Corp. 80386 and 486-based Personal System/2s. The midrange group includes the RT worksta-

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Imaging keeps on trucking

North American Van Lines wants system to drive down costs, save time

ON SITE

BY ELLIS BOOKER
CW STAFF

FORT WAYNE, Ind. — Until recently, the first stop for paperwork at trucking giant North American Van Lines was a manual system dating back to the 1930s — a string of filing cabinets containing thousands of pieces of paper in color-coded folders.

But in December, the company put into use what is believed to be the first optical-based document system at a trucking company.

Officials at North American said they believe the $1.05 million system will cut costs and significantly reduce the time it takes to move the 4,000 to 7,500 documents that come into its mailroom each day for the revenue department and then go back to customers as invoices. Best of all, they said, s customer will get immediate answers to questions about their shipment's status through terminals supplied to all customer service agents, who will be able to review all documents associated with a job.

Paper assembly line

According to Leslie D. Sperry, manager of technology management services, North American's old document system was nothing less than a paper assembly line, annually processing some two million to three million documents.

"When you think about what it takes to even file a document, you can see the savings," she said. "They have to do a gross sort of the mail, because you can't have someone on roller skates going back and forth the length of the files."

The heart of the storage system is a Filenet Corp. OSAR-64 optical-disc jukebox and minicomputer. Able to manage up to 64 12-in. optical discs, the OSAR can hold about 3.5 million pages — the equivalent of 320 five-drawer file cabinets.

The application linking the image system to North American's Amdahl Corp. mainframe database was written by two employees in North American's information systems department and one from the revenue processing department.

"Our image network is separate from our data network," Sperry said. "Images run from 50 to 500 times the number of bytes for a page as for a page of data. If we separate them, we can tune each one for what it's best for."

Optical storage will also mean the virtual end of North American's micrographics department, which until now has been a centerpiece of the document operation.

The impetus for the current application began with an analysis of micrographics technology, according to John Pentangelo Jr., vice-president of revenue processing and accounts services.

While optical "wasn't a good alternative to micrographics," Pentangelo explains, it did suggest the ambitious project of integrating optical storage into the department's operations.

"We're taking the whole thing forward so that as soon as a driver walks in the door or as soon as the invoice hits the mailroom, the document will be scanned, committed to disc and we will be able to do our [financial] calculations," Pentangelo said.

Scanning will also make the documents immediately available to other departments, from customer service to the cargo department. The workstations — 41 are now in place — are linked over the twisted-pair Ethernet network st North American's headquarters. North American officials estimate the optical system will store 1½ year's worth of documents.

To start, North American has put the system into its commercial transport operation. But it plans to deploy the system in its other two divisions over the next year.

The current application has two document-entry stations, each with a high-resolution monitor and document scanner. Taking incoming paper operators place documents into the scanner, which looks like a copier.

Once scanned, the images are presented on-screen and given a unique document ID number. The images are indexed and assigned the proper shipment number. Later, when a customer bill is generated, this is also added to the image record. Both the document ID and shipment number ID are managed through an Oracle Corp. database.

The shipment number in the Filenet system is used to access information stored in the Amdahl mainframe running MVS through a CICS inquiry.

At post-auditing in the revenue department, operators review the scanned document on-screen, along with its associated mainframe record, contained in a 3270 window at the bottom right quadrant of the screen.

Phase two of the project, now under way, will give workstations to agents, allowing them to access shipment orders and other documents. Agents now wait a day or more for copies from the micrographics department.

Tandem midrange gains storage enhancements

BY J. A. SAVAGE
CW STAFF

Tandem Computers, Inc. recently announced new storage enhancements and communications products for its 3-year-old, midrange fault-tolerant CLX computers.

The company's first communications subsystem, the 3650, off-loads communications management, said Roy Graham, product manager for Tandem's distributed systems. Fiber-optic cable allows high-speed communications at distances up to 500 meters away from the CLX or one of Tandem's other computers. It also allows 372 communications lines per processor pair, the company said.

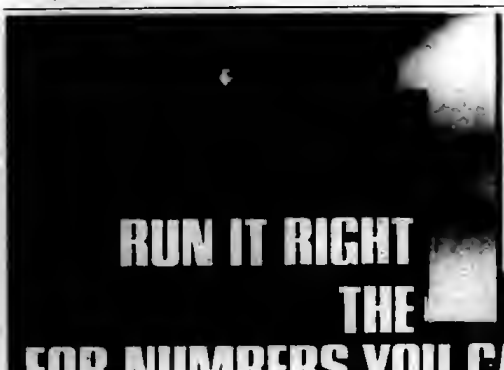
Two other communications products offer higher speeds for synchronous and parallel interfaces. The 3604 Bit Synchronous Interface provides higher individual line support than its earlier product, from 64K bit/sec. to 256K bit/sec. The 3601 Parallel Interface is a printer or general-purpose interface.

Storage products include the company's first external disk subsystem for the CLX, the XL80. It has 200G bytes of formatted storage capacity.

Tandem also enhanced an internal disk drive and tape subsystem. The 4230 Internal Disk Drive has a 648M-byte capacity, up from 300M bytes in the previous model.

The cost of storage dropped from $45 per megabyte to $25 with the new model, Graham said.

The 5170 Tape Subsystem allows users to switch recording speeds, allowing between 1,600 bit/in. and 6,250 bit/in. of storage on ½-in. tape.



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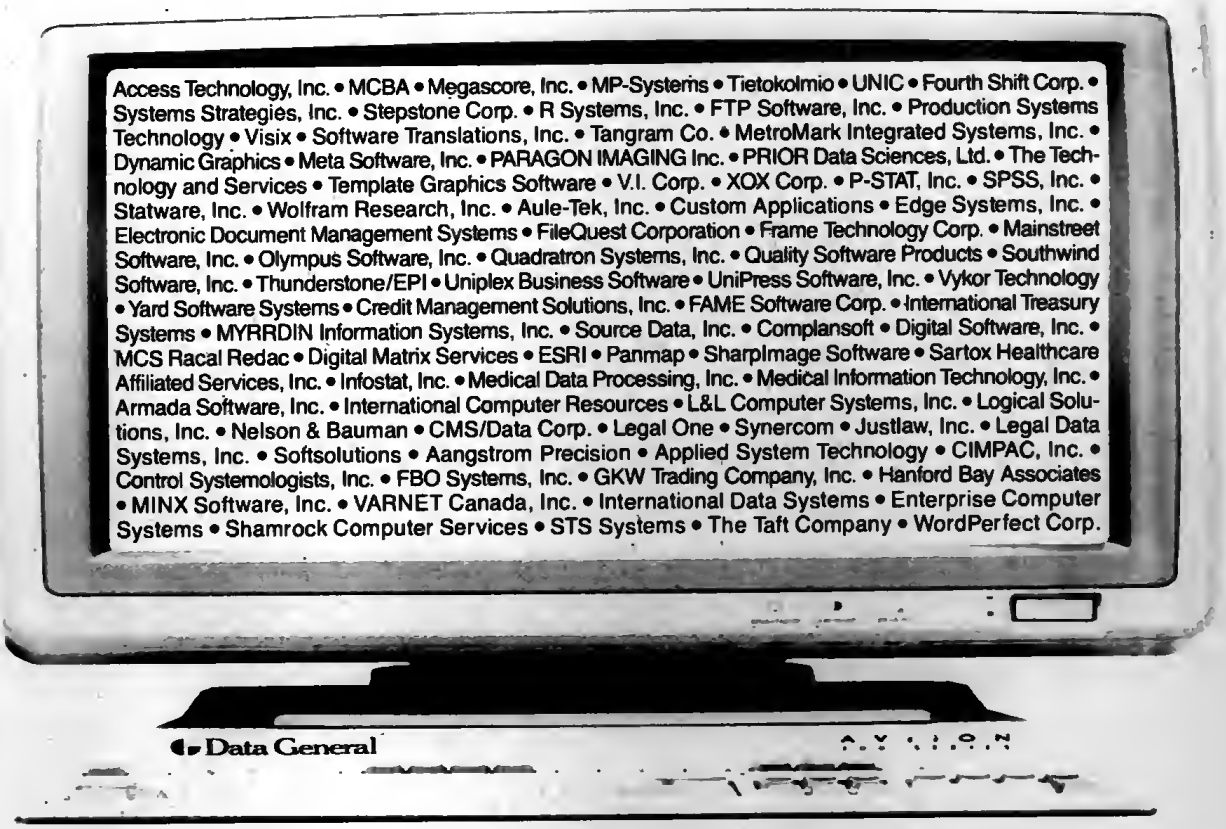

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CA fortifies Unipack software

BY ROBERT MORAN
CW STAFF

NEW YORK — Computer Associates International, Inc. continued to buttress its strongbold in data center management software with the recent introduction of several enhancements to its CA-Unipack VM software package.

The company announced enhancements to five components of CA-Unipack, which consists of nine integrated pieces of software spanning a range of data center operations from storage and resource management to performance measurement and security.

According to Computer Intelligence in La Jolla, Calif., CA-Unipack's components dominate the mainframe market. Computer Intelligence's figures show that in security software, for example, CA holds 55% of the market share, with CA-Top Secret holding 22%, while CA-ACF2 and CA-Omniguard hold the remainder. CI reported that CA holds 76% of the job-accounting software market, with CA-Jars, its performance management and chargeback system, maintaining a 62% share.

CA said the following components are available and have been enhanced to run under VM/XA SP Release I and II.

- CA-Top Secret VM Release 1.1 contains increased protection for Command Program and for the Inter-user Communications Vehicle and VM Communications Facility, which open session access to users outside of their normal resource areas. Software prices range from $12,600 to $31,500, depending on the size of the processor.
- CA-Jars VM Release 7.0, a performance measurement and chargeback system for VM/CMS users, now contains a graphical on-line interface and an expanded on-line reporting system. Prices range from $9,120 to $22,800.
- CA-Spoolman, Release. 1.5, a spool management facility, has been given stronger security hooks to CA-ACF2 and CA-Top Secret security software. Prices range from $3,540 to $8,850.
- CA-CA Vterm Release 3.2, a multisession manager, now offers automated terminal programs for tailoring user applications. According to CA, the programs are transparent to the user and reduce the likelihood of user errors. Prices range from $3,060 to $7,650, depending on processor size.

Top secret upgrade

Douglas Ream, security administrator at the Ohio Department of Transportation in Columbus, said he will be upgrading to CA-Top Secret VM because it will increase VM security and give him a way to back up IBM's PROFS running under VM.

In addition to VM, Ream said the department is upgrading to IBM MVS/ESA. "We want the enhancements in the new release because all the versions are getting quicker in response time," Ream said. "We don't want to slow down MVS because of s [performance] lock on VM."

Unipack VM's individual components cost 20% less; Unipack prices range from $45,360 to $113,400, depending on processor size, CA said.

DEC debuts graphics, expert systems tools

BY AMY CORTESE
CW STAFF

Digital Equipment Corp. recently beefed up its Ultrix computer-aided software engineering (CASE) offering with new products and services for developing graphics-based and expert systems applications. The company also added a smattering of third-party tools.

DEC extended its Network Application Support services to include support for the GKS-3D and PHIGS graphics standards on its Ultrix platforms. Previously, PHIGS and GKS-3D were only supported in VMS environments. With the Ultrix additions, PHIGS and GKS-3D graphics can be incorporated into any application using DEC's Compound Document Architecture, according to the company.

For customers interested in developing expert systems, DEC announced a version of Menlo Park, Calif.-based Lucid, Inc.'s Lucid Common LISP for its reduced instruction set computing (RISC) systems. Lucid Common LISP/Decsystem is available immediately, starting at a price of $3,245.

DEC boosted its CASE offering for its RISC platforms with the availability of several third-party tools from the following vendors: Saber Software, Inc., Interactive Development Environments, Inc., Procase Corp., Microtec Research, Inc. and Microsystems Corp.

The additions are geared toward DEC's Ultrix and workstation customers, but details on a broader Ultrix CASE strategy, including a repository, are still forthcoming, DEC officials said.

Bozman

FROM PAGE 23

This "slice-and-dice" approach to HP computer lines has one obvious advantage: It avoids box swaps to move to higher performance levels. Thus, comparisons to DEC's VAX line seem cleaner and neater, and the cost of ownership appears to be cheaper. However, the new HP upgrade paths do not eliminate the need to trade in an old CPU for a new one when a larger computer cabinet is required.

For example, four board upgrades take a customer from the HP 3000 Model 950 through a dual-processor Model 980. However, users should note that between board-upgrade paths there is still a box swap between the Model 949 and the Model 950. That means HP didn't eliminate box swaps entirely. It just means that the lines have been broadened and sliced into power increments and that the company is downplaying box swaps.

Slice-and-dice upgrades also support HP's points about competing against rivals IBM and DEC. HP is claiming price/performance advantages of 40% to 70% and cites monthly support costs that are one-fifth to one-third lower than the competition's.

A lot of the savings come in the form of lower upgrade costs — and in lower overhead in the form of lower power consumption, less required floor space and, for the midrange units, no need to house the computer in a glass house computer room, as compared with equally powerful offerings from IBM and DEC.

HP used a performance measure by the new Transaction Processing Council (TPC) benchmark to compare and contrast cost of ownership against the IBM and DEC products. HP appears to be using the TPC benchmarks in a manner similar to the older, TP1 Debit/Credit benchmarks that pitted IBM against DEC and others in a show of one-upmanship.

HP's charts of comparative performance against its own projected estimates of DEC's and IBM's CPUs showed strong inroads against DEC's traditional VAX line and IBM's midrange Application System/400 and 4381. Unfortunately, neither DEC nor IBM has yet published their own TPC numbers, as HP acknowledged.

So for now, HP's claims and competitive analysis slides remain unsubstantiated. However, it is interesting to note that HP's lead seemed to disappear, even by the TPC measures, when contrasted with RISC-based DEC machines.

Furthermore, the raw RISC million of instructions per second numbers do little to explain the hidden costs of software conversion to the MPE and Unix HP lines from the IBM 4381's MVS/SP operating system, for example. There would surely be some pain — in the form of time and money — for conversions from any other vendor's computer line unless the "other machine" were a Unix engine that ran the same applications software.

Raw horsepower alone, it seems, can't be relied on to bring HP's latest crop of prospective customers on-line. If HP expects to boost its market share — cutting into the installed base of IBM and DEC — it still needs to sell prospective users on the long-term benefits of HP ownership, despite initially high up-front costs of conversion. Before they throw their VAXs and IBM 4381s away, customers will need to hear the patter of HP salespersons' shoes pounding the pavement.

Bozman is *Computerworld's* West Coast bureau chief.

IF HP EXPECTS to boost its market share — cutting into the installed base of IBM and DEC — it still needs to sell prospective users on the long-term benefits of HP ownership, despite initially high up-front costs of conversion.

Albert

FROM PAGE 25

tion and a soon-to-be announced family of RISC-processor machines.

SAA and AIX have a lot in common. They both encourage the development of applications that are portable across all their platforms; they both offer consistent development tools for programmers; and they both provide end users with standard ways to use the keyboard, mouse and display.

IBM has declared that AIX will never be a part of SAA. However, IBM does recognize that many users will need to combine SAA and AIX. Thus, they are providing for interoperability in five main areas:

- Data sharing. SAA systems offer a standard database facility. Eventually, AIX will also be likely to provide a relational database that will participate in SAA's distributed database implementation. The SAA and AIX database managers will cooperate to allow users to access data in most environments.
- Connectivity. IBM will provide both software support (based on Open Systems Interconnect, LU6.2 and Transmission Control Protocol/Internet Protocol) and physical connectivity (based on Token-Ring, Ethernet and X.25).
- Network management. Netview, IBM's SAA network manager, will probably be enhanced to support problem determination for AIX nodes.
- Graphical user interfaces. SAA offers OS/2-based Presentation Manager. AIX offers the X Window System interface and will probably soon offer Motif, based on X Window. Presentation Manager and Motif work so similarly that users of one will have no trouble using the other.
- Unix functionality. The SAA platforms — VM, MVS, OS/400 and OS/2 — will likely include X Window, Motif, TCP/IP and Network File System.

A high degree of interoperability will be built into IBM's SAA and AIX offerings to provide solid connectivity between the two environments.

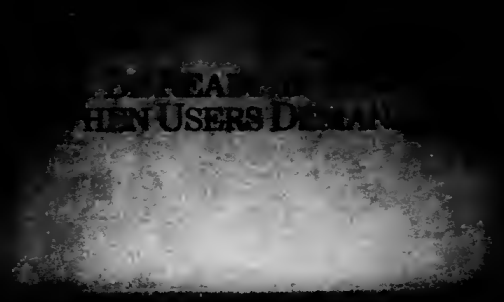
In addition to the obvious investments in VM, MVS and AS/400 platforms, SAA — in particular, OS/2 — continues to receive the major share of IBM's resources.

Today's OS/2 development efforts are spread among labs in Boca Raton, Fla.; Austin, Texas; and Hursley, England (not to mention being done by Microsoft). By far, OS/2 efforts overshadow those that are devoted to AIX.

However, AIX is anything but an afterthought. IBM wants an important presence in the Unix market. AIX will support the PS/2s of today and tomorrow as well as new RISC-based machines [CW, Feb. 5]. Despite speculation that OS/2 will run on RISC systems, IBM does not have definite plans to port OS/2 to the RT architecture.

IBM will devote its resources to SAA and AIX in proportion to the requirements of its user populations and its bottom line. This dual strategy is more accessible and interconnected than any proprietary offering that was key to IBM's growth in the 1970's and 1980s.

Albert is president of Sam Albert Associates in Scarsdale, N.Y.



To know for sure, you'd need a time machine...

NEW PRODUCTS — SOFTWARE

Applications packages

CD Real-Time Systems, Inc. has announced Planned Performance Plus, an interactive, MRP II software system for Digital Equipment Corp. Microvax 3100 series computers.

The on-line system allows users to integrate multilocation product distribution and additional manufacturing data into the ongoing planning process. Its consists of 13 modules that function as stand-alone systems for basic applications use, including accounting, inventory control and payroll.

Prices start at $1,000 per module.

CD Real-Time Systems
P.O. Box 513
St. Charles, Ill. 60174
708-377-2625

Trax Software, Inc. has introduced Version 5.0 of its ESS Electronic Spreadsheet.

Enhancements to the program include linking, command stacking, autosave, template spreadsheets and catalog description functions. The software can operate under all IBM mainframe operating systems and can be outputted to printers equipped with Adobe Systems, Inc. Postscript interpreters.

Prices range from $9,000 to $18,000, depending on CPU size.

Trax Software
10801 National Blvd.
Los Angeles, Calif. 90064
213-475-8729

Systemetrix Systems Ltd. has announced that its Human Resource Management software is available to assist Canadian organizations using IBM System/38 or IBM Application System/400 midrange computers.

The package was reconfigured to meet the needs of the recently enacted Pay Equity and Employment Equity legislation in Canada. It also provides facilities for training and development monitoring; resume, job requisition and agency tracking; staff budget reporting; and absenteeism, vacation and illness tracking.

Prices range from $4,000 to $32,000, depending on CPU size.

Systemetrix Systems
Suite 100
251 Consumers Road
Toronto, Canada M2J 4R3
416-496-1922

Utilities

Morss Software Development, Inc. has enhanced Command File, the company automated batch processing system for the Digital Equipment Corp. VAX/VMS environment.

Version 4.0 of the automated scheduling software includes a resource dependency feature. This function ensures that required resources, such as available disk space, critical files and other devices, are available at execution time, according to the vendor.

Prices start at $6,000, with discounts for additional CPUs.

Morss Software
Suite 206
1215 120th Ave. N.E.
Bellevue, Wash. 98005
206-455-1838

Artificial intelligence

Inference Corp. and Digital Equipment Corp. have announced ART-Ada/VMS 1.0, a high-end expert systems building tool aimed at Department of Defense Ada developers who work in a DEC environment.

The product runs on DEC's VAX series of systems and permits application development for the DEC Windows platform, according to both firms.

A commercial development copy is available for use on DEC Vaxstations for $17,500.

Inference
5300 W. Century Blvd.
Los Angeles, Calif. 90045
213-417-7997

Compilers

NCR Corp., Europe Group and Oregon Software, Inc. have signed an agreement to port Oregon's C++ compiler and development software system to NCR Tower 32 computers.

The software includes C++, ANSI C and K&R C compilers, as well as a symbolic debugger. A single-user license is $3,000.

Oregon Software
Suite 200
6915 S.W. Macadam Ave.
Portland, Ore. 97219
503-245-2202

NEW PRODUCTS — SYSTEMS

Processors

Heurikon Corp. has announced a VMEbus CPU board based on Motorola, Inc.'s 68040 32-bit microprocessor.

Designated the HK68/V4F, the board offers a maximum clock frequency of 50 MHz and a sustained performance of 13.5 Digital Equipment Corp. VAX million instructions per second and 3.6 million floating-point operations per second.

A 25-MHz version of the unit, including 2M bytes of memory, costs $3,495. A Motorola 68030 version of the board, known as the HK68/V3F, is priced at $2,795.

Both units are scheduled for delivery in the second quarter.

Heurikon
3201 Latham Drive
Madison, Wis. 53713
800-356-9602

MAI Basic Four, Inc. has launched the GPX Series 40 family of multiuser supermicrocomputer systems.

Based on the Intel Corp. 25-MHz 80386 microprocessor, the computers incorporate a proprietary BOSS/VX Dual Universe operating system, developed to offer simultaneous support for both MAI Business Four, Inc. Basic and AT&T Unix applications. According to the vendor, the systems are available in both desktop and floor-standing configurations and support from one to 16 and one to 32 users, respectively.

Prices range from $11,500 to $45,600.

MAI Basic Four
14101 Myford Road
Tustin, Calif. 92680
714-731-5100

Texas Instruments, Inc. has unveiled the TI 1505, a 25-MHz, Motorola, Inc. 68030-based multiuser computer that expands its 1500 system line, announced last spring.

The 1505 accommodates from eight to 32 active users. It provides 64K bytes of on-board cache memory and 4M bytes of random-access memory that can be expanded to 16M bytes in 4M-byte increments.

The base configuration carries a suggested list price of $12,900 and includes a 182M-byte disk drive, a 150M-byte cartridge tape backup and 4M bytes of RAM.

TI
Data Systems Group
P.O. Box 181153, DSG-261
Austin, Texas 78718
800-527-3500

Data storage

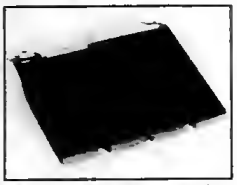
Image Communication Systems Corp. has unveiled Opticom, a McDonnell-Douglas Computer Systems Co.-based optical disk system.

A typical configuration includes a personal computer, a write-once optical disk drive, a laser printer and a 132-column color monitor. Multiuser network and proprietary PC-to-host file software is available optionally.

Data is downloaded from the McDonnell-Douglas host computer and is automatically indexed to the PC, which stores the electronic images and the index. The data and images can then be transferred to the optical disk for storage and retrieval based upon predetermined variables, such as customer name, location and invoice number.

An entry-level system is priced from $20,000 to $50,000, depending on configuration.

Image Communication Systems
9 W. Office Center
2200 Fletcher Ave.
Fort Lee, N.J. 07024
201-461-8008



The DCME-M30 *provides memory boosts of up to 32M bytes*

Clearpoint Research Corp. has announced several memory upgrades that are compatible with the Digital Equipment Corp. Decsystem 5400 and Microvax 3000 series machines.

The DCME-30 upgrades are offered in 8M-, 16M- and 32M-byte increments and feature a proprietary gate array chip set. All are capable of handling DEC diagnostic routines, and all versions utilize surface-mount technology.

Prices range from $2,850 to $9,995, and the products are supported by a lifetime warranty.

Clearpoint Research
35 Parkwood Drive
Hopkinton, Mass. 01748
508-435-2000

Nemonix, Inc. has introduced a series of memory arrays for the Digital Equipment Corp. Vaxstation 3100.

The NXVS31 series arrays are available in 8M-, 12M- and 16M-byte capacities. According to the company, the products utilize 1M-byte dynamic random-access memory and allow users to reach the maximum Vaxstation 3100 memory capacity of 32M bytes.

Pricing starts at $2,895.

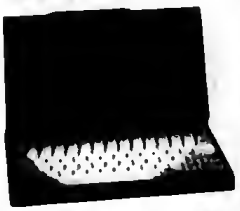
Nemonix
106 South St.
Hopkinton, Mass. 01748
508-435-9087

I/O devices

Qume Corp. has expanded its line of ANSI terminal products with the addition of the QVT 323ev, developed as a direct replacement for Digital Equipment Corp. VT320s and Wyse Technology ANSI terminals.

The device offers DEC VT 320, VT 220, VT 131, VT 100, VT 52 and Qume Native Mode emulations. It combines a 14-in. screen with a 73-Hz refresh rate. The unit costs $495.

Qume
500 Yosemite Drive
Milpitas, Calif. 95035
408-942-4000



Data General's Walkabout *can fit into a briefcase*

Data General Corp. has introduced a portable, battery-powered terminal.

Weighing in at five pounds, the 12- by 10.6- by 1.9-in. Walkabout was designed to fit directly into a briefcase. It includes Data General, Digital Equipment Corp. VT-220 and ADM-3A ASCII terminal emulation and communicates via a built-in 1200- or 2400-baud modem, according to the company.

It is priced from $799 and volume discounts are available. Shipments are scheduled for the first quarter of 1990.

Data General
3400 Computer Drive
Westboro, Mass. 01580
508-898-4051

Decision Data, Inc. has announced a workstation that offers three types of terminal emulations.

The DDCC 3597-01/21/61 can emulate IBM 5291, 3196 and 3197D terminals, the company said. It was designed to operate in an IBM midrange system environment and in either an 80- or 132-column application mode. Features include a 14-in. monochrome monitor, keyboard reprogramming capabilities and printer command substitution. The workstation is priced at $1,295 for a green or amber model and $1,395 for a page white unit.

Decision Data
100 Witmer Road
Horsham, Pa. 19044
(800) 523-5357

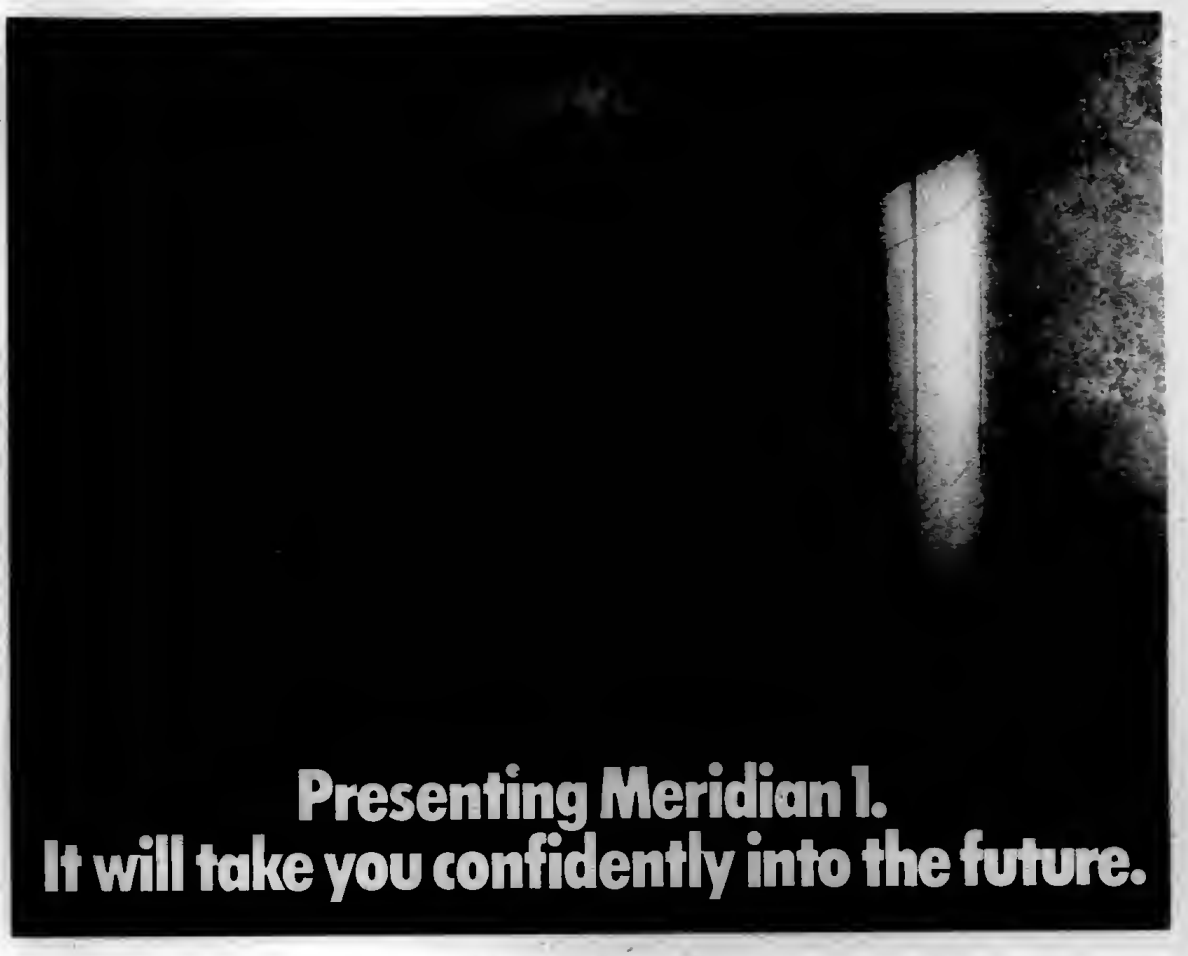
Robotics

Apollo Seiko, Inc. has announced a point soldering robot developed to automate the hand soldering process.

The Aporobo 4TPS4-axes Point Soldering Robot can store as many as 30 different soldering conditions. The device can execute functions three to 20 times faster than most skilled technicians would take to perform the same task.

The unit is available completely assembled or without the base and fixture.

Apollo Seiko
Suite B
9225 Alabama Ave.
Chatsworth, Calif. 91311
818-718-1064



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MICRO BITS

Douglas Barney

Nightmares and dreams

There are two kinds of dreams — nightmares and those where your wishes are fulfilled. With particularly bad nightmares, you walk around for days afterward looking a tad nervous. Those in the personal computer business have had a nearly endless stream of such bad dreams; that's why so many look so peaked. Here are just a few of the worst.

The operating systems nightmare. This has to be the most horrifying, painful nightmare of all. IBM introduced the AT in 1985 with a chip that was supposed to multitask and address up to 16M bytes of random-access memory. Then it wrote an operating system that allows the chip to do all these great things. OS/2 shipped in 1987. Know someone who uses OS/2? How about someone who uses OS/2 on the original 6-MHz IBM PC AT? No? I thought so.

Vendors are still fighting over OS/2. Companies such as Lotus that were dumb enough to put big bucks into it are now afraid that Windows is growing too fast and will slow the move to OS/2. That is why they had IBM get Microsoft to limit, at

Continued on page 41

Software copyright a mixed bag

ANALYSIS

BY PATRICIA KEEFE
CW STAFF

"He who reflects on other men's insight will come easily by what they labored hard for."
Socrates (470-390 B.C.)

"More and more software development talent, money and time has been spent on imitation rather than on true innovation."
Lotus President Jim Manzi, in an open letter to developers May 1987

Are there any truly new ideas?

That question often pops up in discussions about the latest trends in music, fashion and architecture. In the last half of the decade, however, the software development community has taken that philosophical point of debate a bit further.

Thanks to a litany of suits, that query has expanded to include the following brainteasers:

- Can an idea built on the foundation of another idea be considered original?
- Can a screen display or underlying structure be copyrighted?
- When does a menu go beyond a mere list of functions?
- If the programs are similar but the source code is different, has copyright been violated?
- How do you apply copyright in an industry where it is desirable — and, in some cases, mandated — for products to offer a certain level of similarity, if not compatibility?

These and other questions are the subject of much debate as the industry watches the first round of testimony unfold in a copyright infringement suit filed three years ago by Lotus Development Corp. against Mosaic Software and Paperback Software International (CW, Feb. 5).

Some of the issues at hand involve political or ethical considerations and cannot be arbitrated by a court of law, although they can give weight to a deci-

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Inside

- Small systems, big cities. Page 39.
- Ashton-Tate announces Unix version of Dbase for Sun workstations. Page 39.
- Intex releases 1-2-3 tax template. Page 42.

IBM, Microsoft relax views on size of OS/2 threshold

BY CHARLES VON SIMSON
CW STAFF

REDMOND, Wash. — IBM and Microsoft Corp. executives are gradually changing the emphasis of their statement of direction to "make a concerted effort to enable OS/2 for 2M-byte entry systems." The message of late fall — that they could not commit to 2M bytes — has evolved into a midwinter view that the specific threshold is not important.

Most recently, in an interview with *Computerworld*, Microsoft Chairman Bill Gates said that while the company was working hard toward a 2M-byte version of the operating system, minimum memory requirement is not a key issue in the the operating system's acceptance.

"It is only a lack of applications and drivers that has held OS/2 back," Gates said. "We are reducing OS/2 and will reduce it further, but there is no magic to 2M bytes. The percentage of the reduction is not what will cause acceptance."

While IBM executives agree that the 2M-byte level is not magic, they seem to place more of a premium on the importance of driving down the minimum size of the system. Privately, a senior IBM executive close to the OS/2 development effort also downplayed the importance of the exact level, indicating that he felt a pared-down version of OS/2 was an important factor in market acceptance.

Neither company will comment on the specific status of the development effort.

The current view differs in degree from the joint statement of direction issued by the two companies during the Comdex/Fall '89 trade show last November. At the time of the announcement, IBM Entry Systems Division President James Cannavino said he felt that the 3M-byte memory requirement of OS/2 had slowed acceptance of the operating system.

In the following days, senior Microsoft OS/2 executives Peter Neupert and Steven Ballmer said they could not commit to a 2M-byte version and that it was simply a "loosely written" statement of direction.

Gates argued recently that the cost of memory is falling rapidly enough that memory requirements and cost will soon intersect with the needs of entry-level corporate users. Also, the sophisticated needs of users will require greater functionality than a minimally configured system would provide, Gates said.

"We are interested in keeping the system running as small as we can, but people will get what they need to run applications," Gates said. "It makes no sense to say there is a specific number."

Nor are users looking for a magic number. "Today, the system is running at a size for both clients and servers that we just can't live with in the short run for low-end applications," said an MIS director at a Fortune 500 insurance company. "Memory will come down, and by itself, 2M bytes may not be critical. But without commitment to a goal that is written in stone, I wonder how hard they will push."

Some folks think that COBOL, the language of the past, may also be the language of the future!

"Micro Focus COBOL for Presentation Manager has suddenly become the right language." . . . . . **BYTEweek, 6/19/89**

"And COBOL, the language everybody uses without admitting to it - also refuses to go gentle into the night of old technology. . . Micro Focus appears ready to bring the old-time language into the brave new world of graphical user interfaces." . . . . . **PCWeek, 6/5/89**

Micro Focus COBOL/2 Workbench Awarded 1989 Professional Solutions Award . . . . . **PC Tech Journal, 2/89**

"The COBOL/2 Workbench, available from Palo Alto based Micro Focus, Inc. is by far the most powerful and complete PC-based COBOL development and maintenance toolset. This package is the Cadillac of PC COBOL toolsets." . . . . . **System Builder Magazine, 1/89**

Micro Focus "ANIMATOR is a sparkling example of the reason why the PC-based COBOL workstation represents a quantum leap in programmer productivity." . . . . . **Database Programming & Design, 10/88**

"Could COBOL be the key to the success of OS/2?" . . **BYTEweek, 6/19/89**

Micro Focus Awarded Four Out of Four Ribbons for "Overall Value" in Readers' Choice Awards . . . . . **InformationWEEK, 4/24/89**

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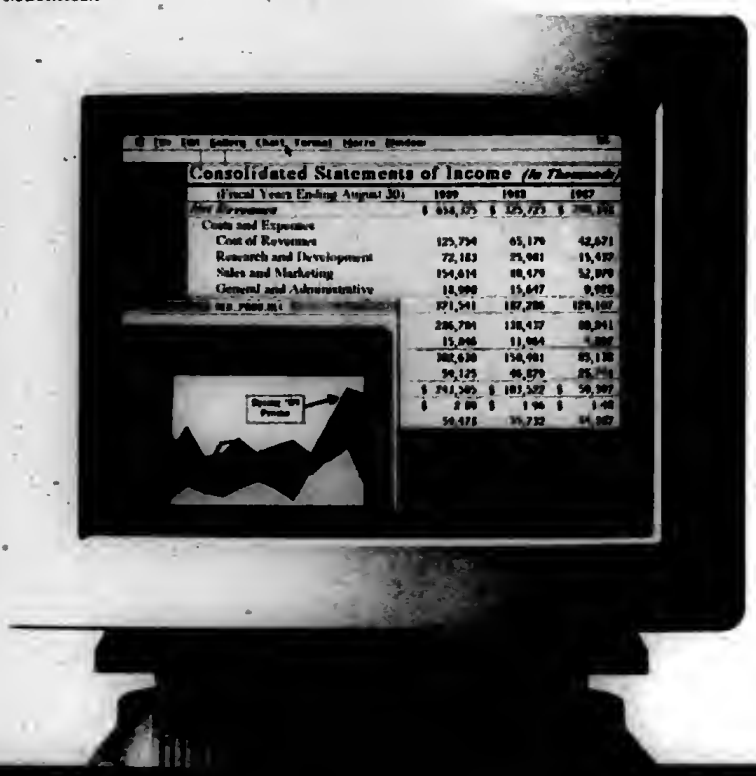
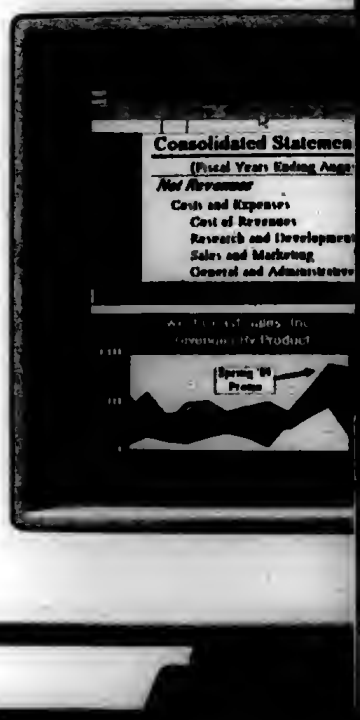
DOS-Windows 286/386





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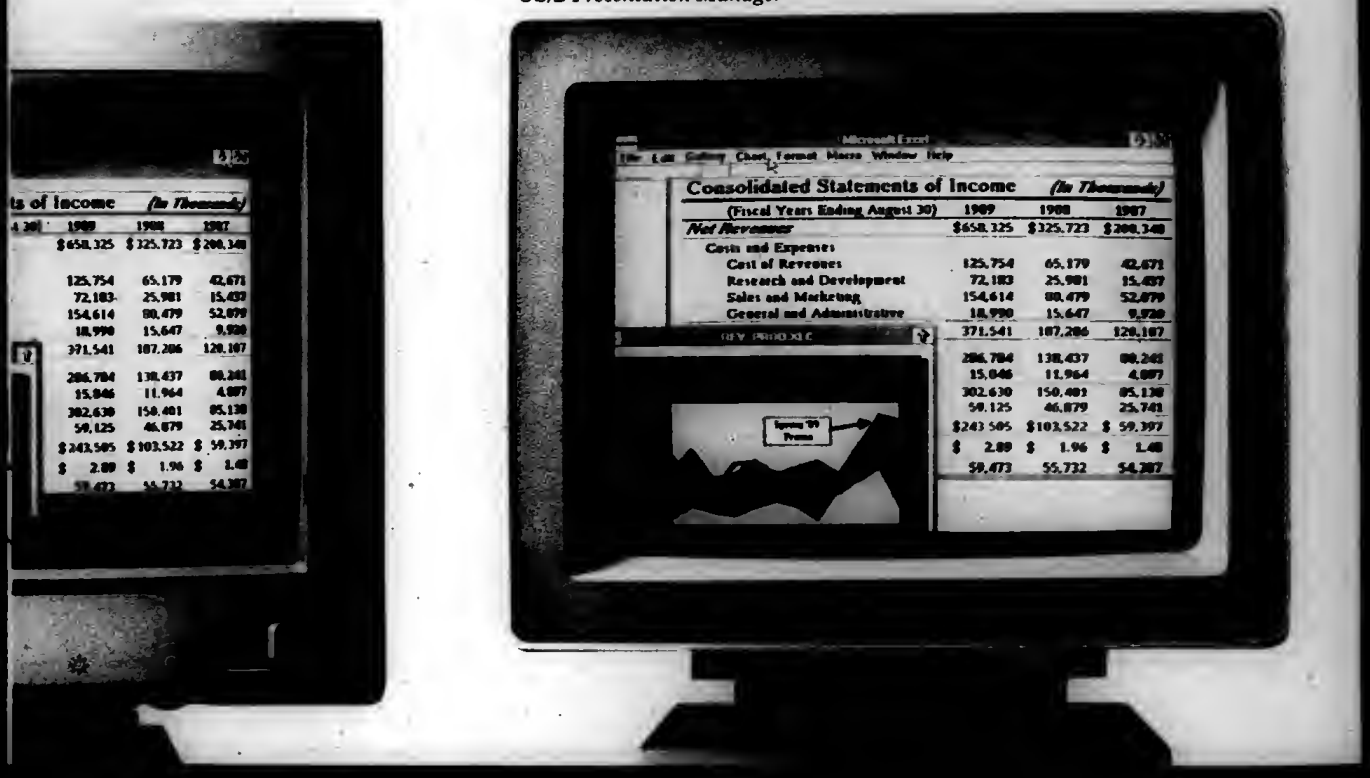

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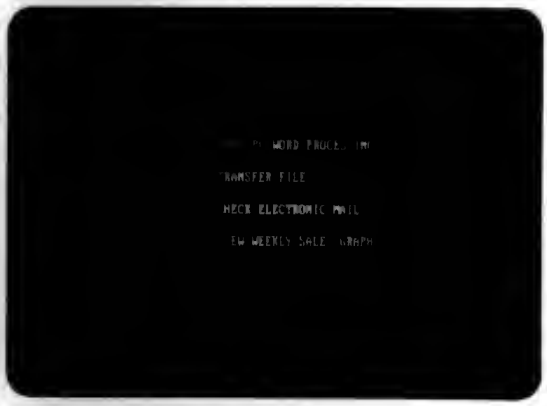

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SMALL TALK

Christopher Lindquist

Fear of sharewaring

Shareware has been unfairly treated, thanks to a perceived rash of infectious software in 1989.

As a result, many people are worried that anything not wrapped in plastic with a glossy user's guide is a sure way to catch a dreaded bug. However, it is far from accurate to consider shareware the Typhoid Mary of the software community.

Shareware tends to be written by people who love to program. Their ideas are often triggered by oeeds not met by commercial software.

Occasionally, these programmers will feel the urge to distribute it to users with similar needs. Shareware allows software to enter the mainstream and produce income without people spending a fortune.

There are also companies dedicated to shareware. These firms are usually supported by registration fees. One of the best known is Buttonware, which offers products such as PC-Type, PC-Calc and PC-Files. Even Fortune 500 companies have licenses on Buttonware products.

The shareware concept is simple. You receive the product for free and have between 30 and 90 days to test-drive the product. If it meets your needs, you pay the author a registration fee. Most shareware programs have fees between $10 and $50. This gets you the latest edition of the program and, usually, documentation. Often, you are entitled to free upgrades and support from the author, either via phone or bulletin boards.

In contrast, shrink-wrapped software forces you into a licensing agreement upon opening the package, after which you are stuck with it. Even with a money-back guarantee, you have to pay before wading through an arduous return process.

Since this can be a hassle, and because business software is often too expensive to junk, users may find themselves saying, "Well, it isn't too bad. I guess I can use it." This can be avoided by test-driving software.

There are many ways to receive free copies of shareware. Packages can be downloaded from bulletin boards. Companies that supply shareware for the

Continued on page 41

Of mice, men and architecture

ON SITE

BY JAMES DALY
CW STAFF

TORONTO — Most men build cities out of sweat and steel. John Danahy uses a keyboard and a mouse.

Danahy and his team of students at the University of Toronto's Center for Landscape Research are among a new generation of landscape architects stretching the imaginative possibilities of their trade in a fashion only dreamed of a few years ago.

Using an array of Silicon Graphics, Inc. workstations and homegrown software, Danahy creates and maneuvers on-screen images of towering buildings and stately maples with the ease of a child rearranging a metropolis made of Lego blocks.

Dream weaver

Although the machines have yet to supplant the traditional pencils, pads and T-squares of their office, they have lent a startling new dimension to landscape design, producing three-dimensional images so sophisticated that viewers can vicariously walk through or fly Peter Pan-like over parks and offices that are little more than a twinkle in a designer's eye. "We're creating the next generation of a city on a 12-in. screen," Danahy said.

The center performs contract work for a variety of private and government urban evolution projects, working on ventures as diverse as the addition of floor space to federal office buildings to the reclamation of sprawling railroad yards.

Danahy's group creates the exterior framework into which architectural teams must nestle their individual atructures, in much the same way a sculptor whacks off huge chunks of a misshapen piece of marble before settling into the fine art of chiseling out a hand, face or arm.

"Most architects think of their buildings as a discrete object, devoid of the context in which they are being placed," Danahy said. "We're concerned with a city composed of tens of thousands of these objects."

Graphics workstations *are changing the way architects work and think in front of a drawing board*

Before the outlines are complete, he and his students have often toyed with dozens of compositional alternatives. Suppose the buildings were six stories high instead of eight? Tap a few keys and the scenario appears. What does a central boulevard look like if the trees lining it are placed 200 feet apart instead of 300? How does the structure appear when viewed from the north? The west? The south? The answers are only a few keystrokes away.

The rapid access to these "what-if" simulations not only increases productivity over conventional flat drawings, but it also provides a powerful tool that transforms the way architects such as Danahy work and think when they are in front of the drawing board.

When planning any urban evolution, architects consult a variety of special interest groups ranging from neighborhood committees and environmentalists to city and regional planners. Each round of meetings often produces the need to redraw earlier scenarios.

"We have to work in a lot of legitimate concerns," he said. "Unlike a lot of other disciplines, everyone is an expert when it comes to the world they live in."

Unfortunately, redoing architectural drawings is often a painstaking process that can gobble up days or weeks.

The graphics workstation, Danahy said, is ideal for translating occasionally vaporous ideas into concrete visuals. A reworking that once took several days can now be polished up in less than 20 minutes, he said. "A city planner may come up with five or six major issues in the first hour of examming a project," Danahy said. "Resolving those issues used to sometimes take weeks."

Danahy chose the Silicon Graphics system for what he calls its intuitive and easy-to-use design. "No other systems allow us to work with our images as elegantly," he said.

The final landscape drawings are then handed to architectural firms that must build their design into the environmental skeleton Danahy provides.

A recent project involved the design of the ceremonial route in Ottawa — the Canadian equivalent of Washington, D.C.'s Pennsylvania Ave. — and the redesign of the government center at Parliament Hill. The system became a hit in government circles when a Danahy-supervised team created a design for the expansion of federal buildings that was far less costly and more pleasing to view than the original plans had envisioned.

Wishful thinking

Like any computer user, Danahy has drawn a wish list for future enhancements. In addition to technological issues — more memory, more throughput, higher polygon resolution — Danahy complained about the lack of support for Autodesk, Inc.'s Autocad computer aided-design software. Autocad has been a standard for the exchange of data within architecture groups. "We've got software with good drafting systems, but going out to the final documentation phase has been a problem," he said. "We'd like to see Autodesk and Silicon Graphics get together on this issue."

Next on the agenda are plans to tear up and revitalize a railroad switching yard that covers a broad stretch of Toronto. With the workstation-based system, the potential for that rusty morass is substantially more varied than if the architects were still bound to pen and ink drawings. "The tiny details don't chew up our time as much anymore," Danahy said. "It opens up whole new windows of possibilities."

Ashton-Tate adds Sun spice to Dbase IV line

BY CHARLES VON SIMSON
CW STAFF

TORRANCE, Calif. — In an effort to broaden the appeal of the troubled Dbase IV database product line, Ashton-Tate Corp. recently announced that a Unix version of the product would be available for Sun Microsystems, Inc. workstations. The new version, however, is seen as unlikely to spark much demand.

"Dbase IV as a database manager is of no value at all," said Rich Finkelstein, a database analyst at Performance Computing, a Chicago-based market research firm that champions SQL databases. "Ashton-Tate's problem across the product line is that they have done no upgrade to the basic technology in four years. A new version does not change that."

Finkelstein and others point out that users are unlikely to pass up leading-edge, Unix-based databases from vendors such as Informix Software, Inc. and Sybase, Inc. for Ashton-Tate's older database management system technology.

"If Ashton-Tate can finally develop a version that has a link to [Microsoft Corp.'s] SQL Server, then Dbase might have value as a PC development language," Finkelstein said. "But as a data manager, they are way behind players such as Informix."

Dbase IV Version 1.1 is expected to include a link to SQL Server. The product would allow users to port DOS-based databases to Sun's Unix-based platforms. The capability might spur demand for Dbase as a development language alternative to C for databases.

Although the latest version of the product for OS/2 has been plagued by bugs and missed shipment dates, the DOS version remains the market-share leader in desktop database products. The company is hoping that the size of the current customer base, coupled with the new platform, might give the company a much-needed shot in the arm.

"We want to leave the message that we are serious about Unix," said Ken Rhei, senior product marketing manager for the Dbase IV Unix/VAX platforms.

That is likely to mean a wide number of platforms. Officials would not confirm whether the database would be ported to Microsoft's Xenix for Intel Corp.-based personal computers or to Next, Inc.'s Mach version of Unix but did leave the door open for developing such products.

Ashton-Tate officials would not say when the product would be available, stating only that it would be in 1990 and that other platforms would follow quickly. "We are trying to rebuild our credibility with shipment dates," Rhei said. "We will formally announce the product very close to when it is ready to ship."

Copyright

CONTINUED FROM PAGE 35

sion. Other issues, however, will clearly be decided by the courts.

Lotus officials have said their suit seeks to promote innovation. They contend that developers will be less likely to make an equity investment of time, energy and money if they cannot be assured their work will be protected.

However, a May 1989 survey of approximately 700 developers at a conference of computer interface designers revealed that a startlingly high percentage do not support such suits.

"The overwhelming majority [about 80%] thought that if these suits establish strong 'look and feel' protection through copyright, it will have a negative effect on the field," said Pamela Samuelson, a visiting professor at Emory Law School and a specialist in software intellectual property law. A substantial majority also forecast a negative effect on their own work.

In addition, after hearing legal debates on copyright issues, about half of the respondents said they had changed their views on the issue. "About 10 times as many changed their mind to say copyrights should be weaker," Samuelson said. "These people are not anarchists. They believe it is appropriate to protect the source, object and pseudo code, and [less than a majority] also support protection of icons and algorithms by patent."

Some critics ascribe dark motives to copyright suits. They fear these suits will create a monopoly on ideas, thus crushing innovation.

The Lotus suit, among others, has invoked the ire of many developers who claim Lotus, Apple Computer, Inc. and Xerox Corp. are breaking long-honored "rules" governing software development.

"Lotus has decided they are going to sue people who did what they have done and what the rest of the industry had done for years," Paperback Software President Adam Osborne said.

"For years, we all followed the rule that as long as the source code was different, it didn't matter if it looked the same," said Richard Stallman, developer of Emacs, a widely used and copied programming editor. Osborne cited the ROM BIOS that Phoenix Technologies Ltd.and others sell, describing it as "an absolute copy functionally of the IBM ROM BIOS. IBM just said, 'Write your own code.' "

The courts will grapple with the application of copyright to software. Copyright laws were conceived to encourage diversity by protecting unique literary and artistic forms of expression.

Conversely, users seek a significant level of similarity between desktop packages. In the case of the federal government, it demands that all purveyors of spreadsheets offer Lotus WK1 file format compatibility — as do many corporate information systems departments.

Yet the Lotus suit asserts that its organization and sequencing of menus can be copyrighted. "The danger if Lotus wins is that while you could still build spreadsheets, you'd have to make them incompatible, which wouldn't serve the public," Stallman said. "How [ever] much users have spent learning to use [the 1-2-3 interface] is orders of magnitude greater than the cost of developing 1-2-3. So, even supposing that you could come up with a better [spreadsheet] interface, it would really be worse because it's not what the users know," he said.

Setting precedents

Judgments in recent software copyright cases expected to affect the Lotus-Mosaic/Paperback Software suit include the following:

- ***Manufacturer's Technology*** v. ***Cams, Inc.*** — The 1989 decision found that certain internal aspects, as well as the "flow and sequencing" of the various screens, were protectable. Other components, such as the method (keystrokes) in which the user navigated screens, were not copyrightable.
- ***Digital Communications Associates, Inc.*** v. ***Softklone*** — The 1987 decision found that the upper third of two Softklone screens had infringed upon the status screen display of DCA's Crosstalk XVI.
- ***Telemarketing Resources*** v. ***Symantec Corp.*** — The 1989 decision found that what the plaintiff sought to protect was too basic — e.g., menus to access, edit and print files and pull-down menus.
- ***Dataeast*** v. ***Epyx*** — In a case concerning similar video games, the court ruled that when ideas and expression coincide, there will be protection against nothing other than identical copying.
- ***Plains Cotton*** v. ***Good Pasture Software*** — The court found that the structure of the disputed program was dictated by requirements specific to the cotton industry. In ***Bibbero Systems*** v. ***Colwell Systems***, involving a blank form, the court reached a similar judgment.
- ***Atari*** v. ***The National Registrar of Copyright*** — An appeals court ruled this summer that the level of creativity necessary to obtain a copyright was slight.

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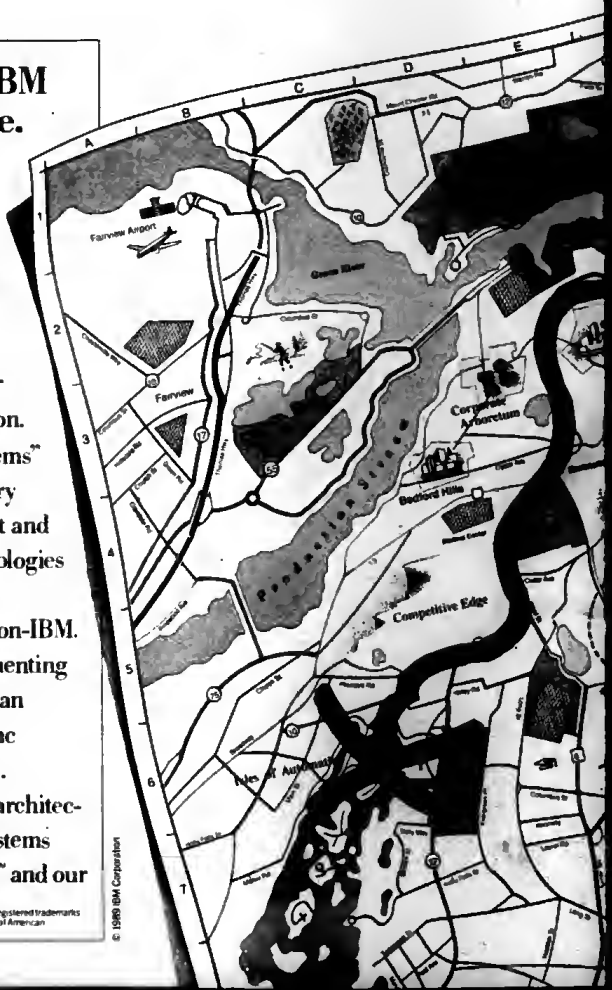

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Lindquist

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price of the disk and a small service fee may be listed at computer shows and through mail-order houses.

If you are paranoid about viruses, you may wish to avoid the bulletin boards. Problems are rare, especially if board operators are careful, but unsavory software can slip by. The safest way to get a copy is directly from the author.

From a business standpoint, no, you probably won't get an in-depth service contract. While there may be bugs, a fix is usually close behind. Many commercial products are being released with bugs that vendors sometimes seem more adept at covering up than fixing.

Most advanced shareware programs contain on-line help files and complete documentation. Some have features more advanced than commercial counterparts.

Since the authors are open to suggestions, new features are often incorporated at the urging of users. And while shareware suppliers don't make outrageous announcements about future releases, you can count on more frequent upgrades with significant improvements.

People who write shareware are not out to make a fortune. Prices are kept low by eliminating middlemen: distributors, retailers and advertisers. While thousands of people may use their products, only a small percentage, estimated at about 8%, will actually register it.

Shareware authors rely on a free market. The credo driving this market is that if someone creates a good product, word of mouth will put it into use. Those who do register packages are supporting one of the most accessible and innovative segments of the software market.

Certainly there are some drawbacks to shareware, but on the whole, there are many offerings that match or surpass shrink-wrapped offerings. And nowhere in the industry will you find such ready access to open-minded suppliers. So take a chance. Who knows, both you and your wallet may be pleasantly surprised.

Lindquist is a *Computerworld* copy editor.

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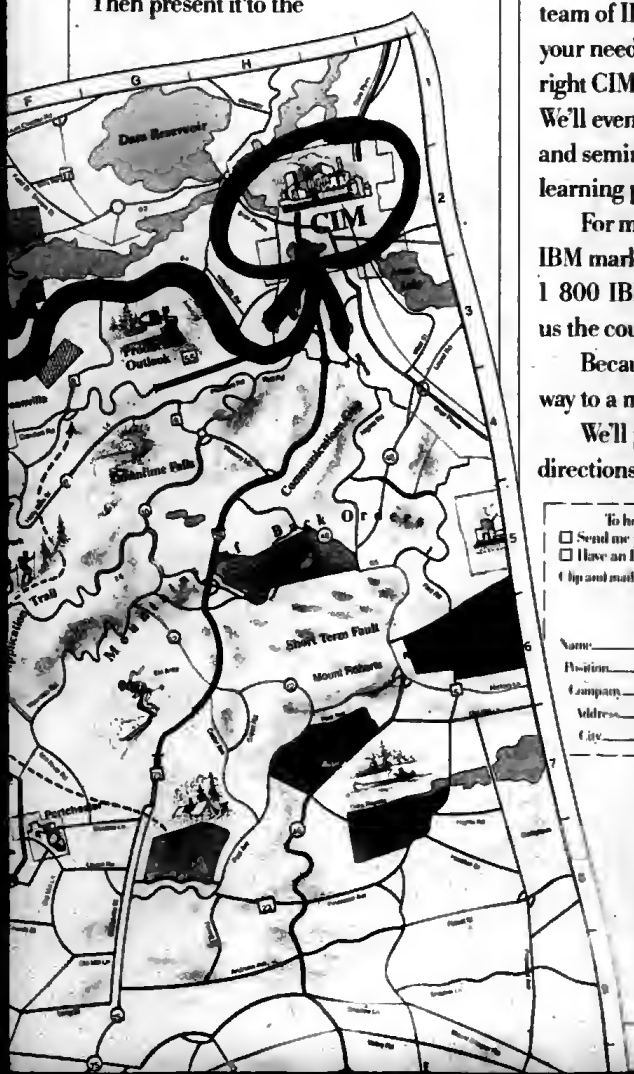

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IBM

Barney

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least in theory, the extent to which Windows will be enhanced. This smacks of customer manipulation.

The 80286 nightmare. Intel built a chip that IBM built a system around. Both became obsolete before any software was written to exploit it. That's why new Intel chips such as the 1486 focus on performance, not new features.

The Dbase IV nightmare. When designing Dbase IV, Ashton-Tate listened to securities analysts who said they needed SQL, marketing people who said they needed ease of use, customers who said they needed backward compatibility and the ability to run in 640K and developers who said they needed new commands. What they got was a mess. Tate is now trying to make Dbase IV work, but by the time it really ships, fewer people than ever will care.

SQL nightmare. Every database vendor spent 1989 yammering about SQL and client/server architectures. But what has shipped for front ends? Paradox? No. Dbase IV with client/server support? No. Lotus/DBMS, whatever that is? No. This stuff is still coming, but when it arrives, users and database administrators are going to find it more complicated and limited than they have been led to believe.

The lawsuit nightmare. Ever wonder why the legal profession has such a bad reputation? Just look at the senseless and endless litigation in the computer business, and the answer is obvious.

The list reads like a who's who of software: Apple, Microsoft, Lotus and even Xerox. The only positive aspect is that customers are paying less and less attention all the time.

Mitch Kapor's personal nightmare. Mitch had a dream — to develop a layer of systems software that would make computers easier to use. Unfortunately, the vendors Mitch tried to interest snubbed him and his firm, On Technologies, so he was forced to move into the applications business.

Despite the many harrowing user experiences, there are certainly bright spots to this business. Here are a few examples of "Good Dreams."

Processor wars. These wars pitch RISC vs. CISC, and everyone is getting faster by the minute. Unfortunately, systems cost more when everything has to match the speed of a faster CPU, and there is still almost no software to exploit the power of these chips.

Lotus has regained its footing and is getting ready to deliver products announced in April 1987 — all except Lotus/DBMS, it seems.

The Apple Macintosh has been a sea of stability. It may not be the peppiest machine around, but it does the job, and nobody fights about the operating system or writes software without thinking of the interface guidelines.

IBM is finally getting aggressive. Its systems are competitive technically and in terms of pricing.

Unix. I don't know whether the hoopla over Unix is good or bad. It seems absurd to get excited about a 20-year-old operating system. On the other hand, it has a large memory model and the ability to multitask.

Barney is editor in chief of *Amiga World*.

NEW PRODUCTS

Software applications packages

Intex Solutions, Inc. has announced an add-on template for users of Lotus Development Corp.'s 1-2-3 spreadsheet.

Called FAS96, the product was created to assist both corporate tax and accounting professionals in complying with accounting rules included in the Financial Accounting Standard Board's "Accounting for Income Taxes" mandate. The software can also double as a long-range corporate tax planner, the company said. The package is priced at $495, plus $5 for shipping.

Intex Solutions
161 Highland Ave.
Needham, Mass. 02194
617-449-6222

Softstream Technologies, Inc. has introduced Release 3.0 of Blankety-Blank, the company's document and forms completion management software package.

Designed to fill in blank spaces commonly found in word processing programs and preprinted forms (including expense reports, proposals, estimates and sales and personnel documents), the software program creates a questionnaire with as many as 500 questions on any subject and then collects, screens and maintains answers in the appropriate format.

A single-user version costs $99.50, and a four-user network version is available for $249.50.

Softstream Technologies
2740 Hollywood Blvd.
Hollywood, Fla. 33020
800-888-9292

OS/2 software

Language Processors, Inc. has announced its RM/Fortran compiler for OS/2, both real and protected modes.

The OS/2 version of RM/Fortran is a superset of the DOS product that also offers support for the following: file sharing in both multitasking and network environments, an improved interface to C functions and up to 16M bytes of memory under OS/2 protected mode. The product is a full implementation of the ANSI Fortran-77 standard and is X/Open- and Systems Application Architecture-compliant. It is priced at $750.

Language Processors
959 Concord St.
Framingham, Mass. 01701
508-626-0006

Data storage

Silicon Graphics, Inc. has announced increased disk storage and a new chassis design for its Personal Iris workstation.

The 760M-byte disk is available as a standard system disk or option disk for the workstation, and customers may add a second 760M-byte disk to the system to obtain as much as 1.5G bytes of total storage capacity.

The 760M-byte disk costs $6,000. The reconfigured front-loading chassis is offered as a standard feature with the Iris and includes a snap-off front cover to provide easy access to the system disk slot. Both items are available immediately.

Silicon Graphics
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Mountain View, Calif. 94039
415-960-1980

Unix software

The Data Storage Division of Archive Corp. has announced a 386 Xenix driver designed to allow its IBM Personal Computer AT and Personal System/2-compatible 80M-byte ArchiveXL tape drives to operate in a Santa Cruz Operation, Inc. Xenix System V environment.

Jointly developed with Santa Cruz Operation, the driver supports Versions 2.2.3 and 2.3.X of the operating system. It is available at no charge.

The ArchiveXL 80M-byte drive retails at $699 for an internal version and $879 for an external configuration.

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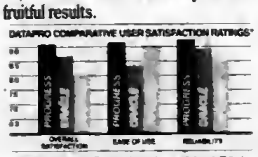

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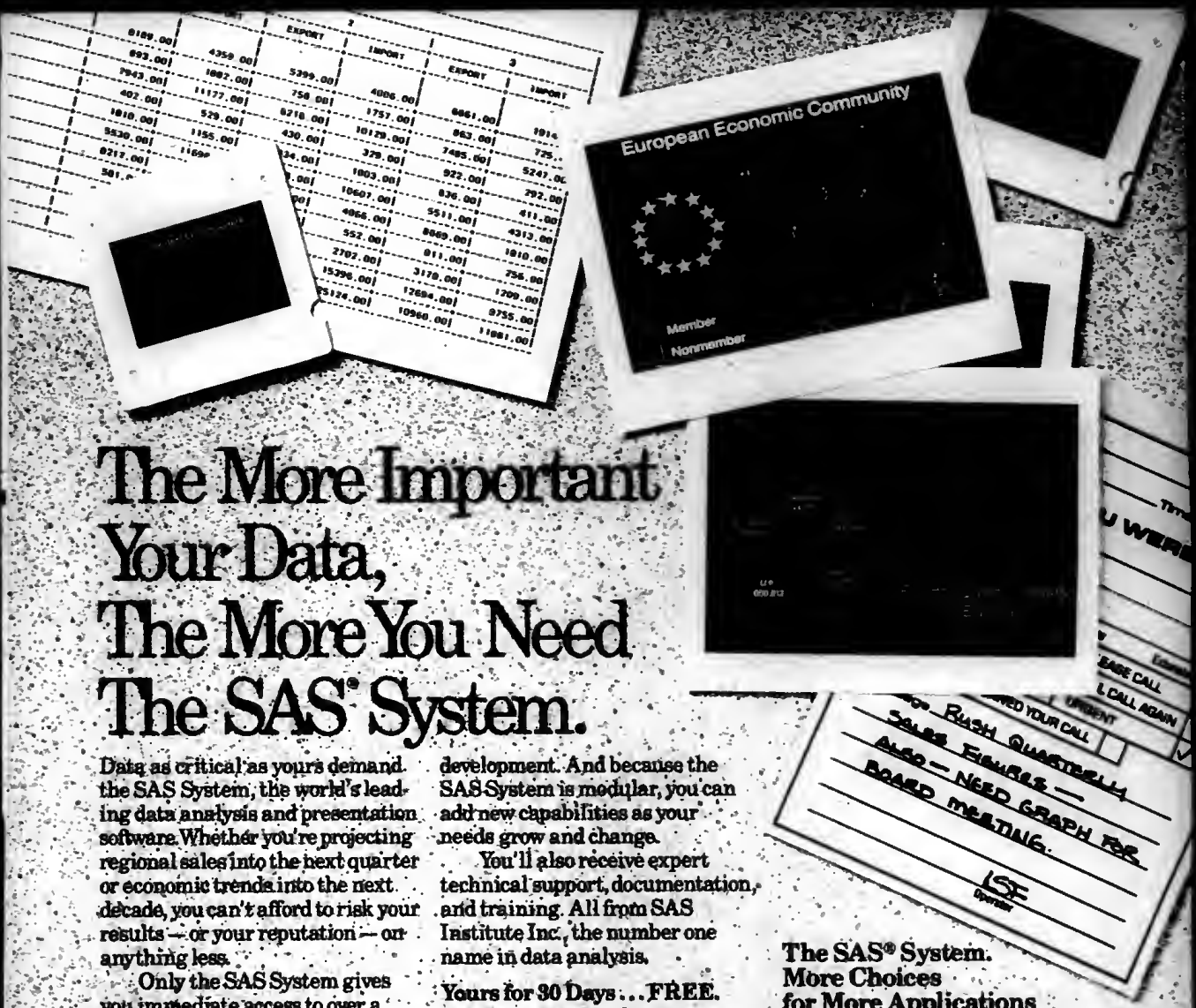

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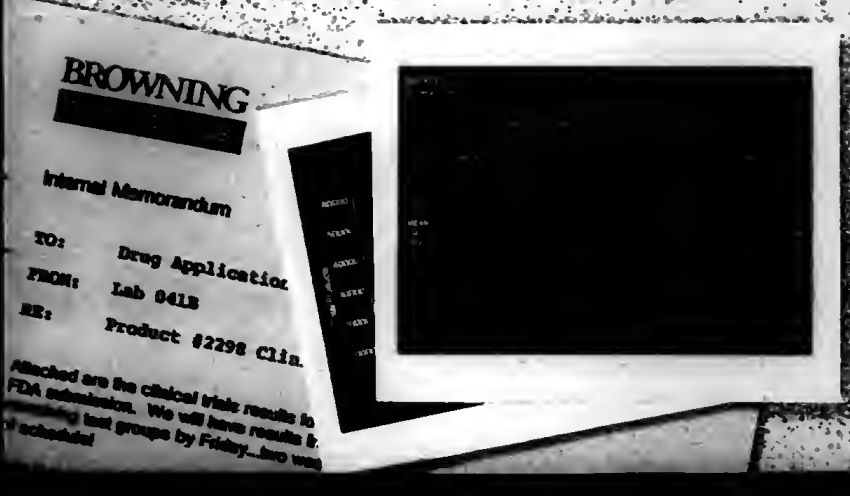

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IDC WHITE PAPER

ISDN—Integrated Services Digital Network

INTEGRATED SERVICES DIGITAL NETWORK

AN IDC WHITE PAPER FOR INFORMATION SYSTEMS MANAGEMENT

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Welcome to the Real World.

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eal-World ISDN.

As an idea, ISDN technology ranks right up there with sliced bread. But what can it do for you in the real world? The U.S. Army's strategic research and development facility at Redstone Arsenal found the answer at their local phone company. South Central Bell showed them how to enlist ISDN technology to help them perform their crucial communications tasks.

South Central Bell and the U.S. Army

Faster. More efficiently. Using the AT&T Network Systems 5ESS® Switch. Now, guided by ISDN technology, Army researchers and engineers can use a single telephone line to deploy simultaneous voice and data transactions. At speeds up to 64Kbs. A mission that used to require special conditioned private lines can now be accomplished on ordinary telephone lines over the public switched network. Call your local telephone company marketing representative to find out how ISDN technology can help you win in the real world.

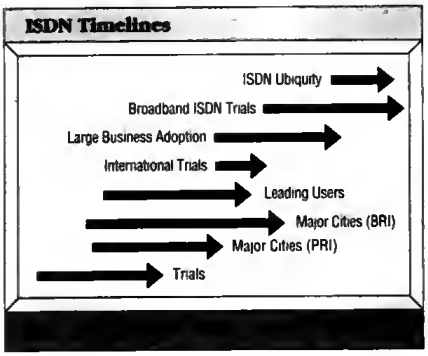
AT&T
Network Systems

ISDN

THE INTERNATIONAL TELECOMMUNICATIONS UNION (ITU), DEFINED ISDN IN 1981 AS: "A NETWORK EVOLVED FROM THE TELEPHONY INTEGRATED DIGITAL NETWORK THAT PROVIDES END-TO-END CONNECTIVITY TO SUPPORT A WIDE RANGE OF SERVICES, INCLUDING VOICE AND NON-VOICE SERVICES, TO WHICH USERS HAVE ACCESS BY A LIMITED SET OF STANDARD MULTIPURPOSE CUSTOMER INTERFACES." ■ THE BENEFITS OF ISDN ARE DELIVERED TO THREE DISTINCT GROUPS. THE TELECOMMUNICATIONS COMPANIES OF THE WORLD (I.E., THE PHONE COMPANIES) BENEFIT BY IMPLEMENTING MORE COST-EFFECTIVE TECHNOLOGY, BROADENING THEIR USER BASE, AND ENHANCING THEIR SERVICE OFFERINGS.

The computer and communications equipment suppliers of the world (i.e., IBM, Digital Equipment Corp., Northern Telecom, Inc., Timeplex, Inc., and Codex Corp.) benefit by the increased demand for network-oriented processing systems as a result of expanded services and markets. And last, and even most importantly, end users (i.e., you and I) benefit by having access to simple-to-use, relatively high-speed, highly reliable, globally available, and competitively priced voice/data/video information services.

The following research paper is meant to provide a general overview and status report of the progress of ISDN. It is not meant to be a technical journal, nor is it composed of ISDN hype. Instead, it paints a realistic, yet hopeful, picture of the next big step in the evolution of the public and private networks around the world.



EVOLUTION OF ISDN

History of ISDN. ISDN as a technology standard has its roots back in the late 70s. It was at this time that AT&T set about the business of integrating different information streams, building toward distributed processing, and redesigning and reimplementing its mostly analog network into a totally digital transmission scheme.

In 1980, while AT&T was preparing for the inevitably more demanding customer base, the worldwide telephony community formed under the banner of CCITT to establish a set of standards for a universal Integrated Services Digital Network. ISDN was born. AT&T in the post-divestiture world let go of the defacto standards setting activity for this country and it was promptly reformed under ANSI and its T1D1 organization.

The standards setting activities were mostly completed in the early to mid-80s with trials starting up in 1986. Needless to say, the progress has been slow, and as a result, many of the initial reasons for an ISDN, such as digital transmission, high-speed end user connectivity, and distributed processing, have been supplanted by other technologies such as local area networks, fiber transmission facilities, private T-1 networks, and high-performance workstations. This is not to say that ISDN has no place in the world as we know it today. It definitely does. If the reason for all networks is timely information access, then ISDN in many ways represents the networking alternative with the broadest potential reach. It may not be the fastest, or the most feature-rich, but it represents the most all-encompassing network of the future.

Why ISDN? ISDN was designed to provide a worldwide mechanism for delivering standardized telecommunications services not just among the world's telephone companies, but also among the world's end-users. The telephone companies of the world are not usually accused of being far-sighted, but they readily accepted that the world was increasingly asking for more than just voice-oriented analog switching. This multi-billion dollar business, although a huge revenue generator, exists within a fairly flat and increasingly competitive market.

Salvation for the telephone companies comes in the form of digital transmission services, the management and movement of voice, data, and video information, and highly profitable value-added services, such as advanced call handling capabilities, mail delivery, videotex, and public data base access. Remember, in the late 70s, the computer and software companies of the world were reaping the benefits of servicing the information-intense environment that would no doubt be present the rest of this century and beyond. The telephone companies wanted a piece of this action. And given the size of most phone companies, only a large piece would be adequate. This could only be accomplished by implementing a large and very powerful network which could then be leveraged into the workplaces and hearts of governments, commercial entities, and end-users of the entire world. Granted it was an aggressive plan, but a boundless profit potential was riding on ISDN's future success. And since the phone companies form the core of ISDN transport and services, those phone companies that implement the most effective, efficient, and timely ISDN capabilities are guaranteed a large return over the next five, 10, and 20 years. This is especially true in today's increasingly standardized and deregulated telecommunications industry.

DEFINITIONS

The ISDN Network Node. Because of the breadth of service ISDN provides, a node could be just about any type of information processing device. PBXs, computers, PCs, workstations, video codecs, terminals, telephone handsets, fax machines, and central

Southwestern Bell is sharing, not secluding ISDN technology

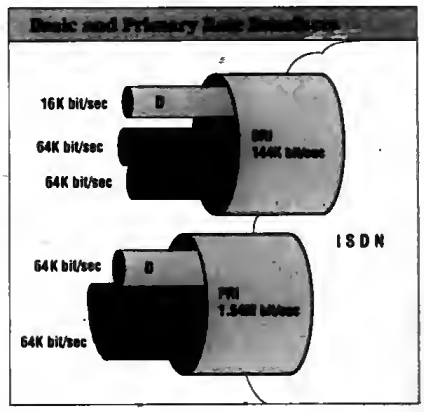
Somehow, this seems too good to be true. In a world where the fruits of technology development are typically guarded like proprietary treasure, Southwestern Bell's Advanced Technology Laboratory here has brought users and vendors together in an environment where the latest technology is shared, not secluded.

Although the central focus of the lab is Integrated Services Digital Network (ISDN), it plays host to an array of additional technologies that are tested under conditions that don't threaten live service offerings. Everything from videotex to fiber optic multiplexers to remote file sharing is under investigation. And the charge for access to the Advanced Technology lab is zero, nothing.

The price must be right. Since the lab opened in mid-1987, a throng of users and vendors from around the world have come to test and develop products in a real world environment they wouldn't otherwise have access to. Users have the opportunity to put their hands on complex, expensive equipment before they make any big dollar commitments to altering their networks. Vendors can test their equipment against central office switches and computers from a variety of other vendors.

office switches are all candidates. The key to ISDN in the near future is making all these devices work together in a coherent and worthwhile fashion.

Here, ISDN's role as integrator of disparate systems, not enabler of new services, is one that is sometimes lost in the glamour and hype surrounding this new worldwide technology. It is this systems integrator role that has attracted most early paying customers to ISDN.



Basic vs. Primary Rate Interface. Basic Rate Interface (BRI) defines three separate channels for use by the subscriber. These channels combine over one physical connection to provide a 144K bit/sec pipe into the ISDN. This pipe is divided into two 64K bit/sec B channels, either of which may be used for voice or data by the end-user, and one 16K bit/sec D channel to be utilized for packetized data and/or control information (i.e., call set-up and shutdown). The BRI is meant to provide ISDN access via end-user devices such as terminals, PCs, telephone handsets, and faxes. The BRI, with its standardized access, will provide for the direct connection of most end users into ISDN. Only those user devices within high-speed LAN environments will be more likely to skip BRI and proceed into ISDN through a Primary Rate Interface (PRI) gateway system. Given that most end user devices (business and consumer) are not operating over megabit LANs, BRI will be the user interface of choice for at least the next five-to-10 years.

PRI specifies 23 64K bit/sec B channels and one 64K bit/sec D channel for use by the subscriber. In all, a total of 1.54M bit/sec is available within the PRI. The PRI is intended to provide bulk connectivity into the network from the computers, PBXs, LANs and high-end multiplexers, on a customer's premises. Although resembling a standard DS-1 (or T-1) circuit in bandwidth, the PRI, with its D channel attached, has much more potential in terms of flexibility, efficiency, and value-added delivery.

Terminal Interface Types. Basically, there are two kinds of terminal equipment: those devices that have built-in ISDN interface and signalling compatibility, and those devices which access ISDN through a converter device. Terminal Endpoint Type 1 (TE1) devices, such as an ISDN integrated voice data personal computer or ISDN video codec, are able to be directly connected into the ISDN. Terminal Endpoint Type 2 (TE2) devices support non-ISDN interfaces such as RS-232, V.24, Ethernet, and Token Ring, and require a BRI Terminal Adapter (TA) between them and the ISDN. A TA is a customer-owned and managed conversion unit that provides ISDN BRI access for devices with no such capabilities.

The BRI Terminal Adapter within an ISDN environment functions like the modem in today's analog environment. It will provide the connectivity for non-ISDN end-user devices such as terminals, PCs, workstations, telephone handsets, and fax machines.

Information Streams. As stated previously, the channel types are B and D. The B channel is a 64K bit/sec pipe for user information. That information can be data, voice, or video — or for that matter, anything else that technology provides in the future. Since the most aggressive ISDN service and equipment suppliers come from the voice-oriented world (e.g., telephone companies, PBX and central office switch vendors), the first wave of ISDN utilization will be in the voice-into-data market. This is where voice-initiated dialogues are blended with a computer-data component. The earliest applications for ISDN involve a voice call initiating data processing which results in a coordinated voice and data processing session for a telemarketing service representative.

This is not to say that the data-only side is being ignored. It is not. There are many people who require high-speed access across wide area networks. LAN-to-LAN connectivity is one scenario. Tying campus environment users into a multi-processor environment is another. And certainly, any T-1 (for data or voice/data) subscriber is a third. These applications are less exciting, but nonetheless real. They are also growing in volume, expanding in complexity, and broadening geographically at a significantly faster rate than voice traffic.

Out-of-Band Signalling. The concept of out-of-band signalling comes to us from sideband radio technology. The sideband technique has been utilized within certain portions of the world's phone network for many years. Its use within the entire phone system is very new and revolutionary.

At the heart of out-of-band signalling within ISDN is the D channel. The D channel is the control pipe for both PRI and BRI links. It is designed to carry control information that is related to, but not necessarily part of, the user information that will be contained in the B channels. The information streams that may travel the BRI and PRI D channels need not be unique to each of the two interfaces. The main difference will be in volume, with the PRI D channel needing to service 23 B channels, and the BRI D channel supporting just two. Appropriately, the D channel for BRI is rated at 16K bit/sec while the PRI's D channel specifies 64K bit/sec.

The reason this is so important is best explained through example. Network management is one of the most crucial applications that must operate within a network. However, the more robust and proactive a network management system becomes, the more of the network's bandwidth and processing power it takes up. Given this increase in load, a network management system's principal concern may very well be its own use of the network, a situation that neither a network nor financial manager wants to see. It could also be said that a network management system cannot manage effectively while actually being part of the network. After all, if the network goes down, the network management system is literally turned off, offering no help in any restoral of service procedure.

Out-of-band signalling also serves as the primary platform for many of the enhanced services provided through ISDN. Call set-up, when performed out-of-band, as opposed to today's in-band style, reduces set-up time from 20 seconds to about three seconds. This is the direct result of control overhead being minimized. Literally overnight, by making use of out-of-band signalling techniques, common carriers can free up transmission capacity. Although this is very significant for call set-up today, when we examine the pre-processing of information that will need to be performed for future telephony applications, this reduction in overhead becomes extremely significant.

Broadband ISDN. Broadband ISDN (BISDN) is meant to build upon ISDN's functionality by taking advantage of the widespread

availability of fiber optic technology. With lower error rates and much greater bandwidth potential, fiber optic transmission schemes allow BISDN specifications to reduce error checking overhead and increase information transfer rates to 150M bit/sec. Also of note is the fact that the Synchronous Optical Network (SONET) standards are being adopted for use within BISDN. SONET, initially a Bell Communications Research concept, calls for a more coordinated approach to fiber optic usage and is designed to provide speeds between 50M bit/sec and 13G bit/sec. SONET's inclusion in BISDN specifications bodes well for ISDN's capability to eventually overcome its current bandwidth limitations.

ISDN User Profile

CSX Corporation

The fifth largest U.S. transport company

Task at Hand

Centralizing control of its national railroad operations at a 90-person command center in Jackson, Fla.

Solution

ISDN Primary Rate Interface call-by-call service selection feature

Result

Five, not seven, T-1 access lines are required to support the center's inbound and outbound calls

Savings

$30,000 annually

CURRENT STATUS

The United States. The much-publicized ISDN trials of the last couple of years have enjoyed various levels of success. Unlike past trials of new and untested products, these beta sites were not necessarily trying to weed out the bugs in the technology making up the ISDN components. After all, the technology of ISDN transmission is made up of relatively simple and available mechanisms. Digital transmission is very widespread. Digital Customer Premise Equipment (CPE) is even more widespread. PRI is essentially a DS-1 (or T-1) service. BRI is just a multiplexed line supporting two 64K bit/sec circuits and one 16K bit/sec circuit. Instead, most of the beta efforts have gone toward making the components and services work together in a coordinated and reliable fashion.

So why the expense and trouble of all these trials? Because to the end user, the value in ISDN is in the applications (i.e., end-user services) it offers, delivers, and returns revenue on. The trials are intended to point the way to the promised application or applications. Given the success of IBM's Systems Network Architecture (SNA) because of transaction processing, and PC LANs because of peripheral sharing and peer communications, the proponents of ISDN view application success as driving ISDN success. They are quite right in this estimation.

ISDN (or ISDN services) are just now rolling out into the paying end user community on a tariffed basis. AT&T received approval for its tariffed offerings in the Summer of 1988 after filing for them the previous Spring. By the end of 1989, AT&T planned to make its ISDN PRI service available in 73 cities. By the end of 1990, a total of 290 AT&T central offices will offer ISDN PRI services. Ameritech, through Illinois Bell, was able to offer ISDN services at the same time as AT&T. Pacific Bell and Southwestern Bell have also filed tariffs for services within the past few months.

The European Economic Community. Europe and its Postal Telephone & Telegraphs (PTT) are considered to be a year or so ahead in deployment. This varies from country to country in Europe. France has ISDN capability in approximately 75% of its central office switches, while Germany is only about 40% ISDN-ready. Where ISDN is ahead in Europe specifically relates to services for the end-user. Competition within the European Economic Community is intensifying as a result of the 1992 decree. This near-future political, economic, and technological openness of European industry has driven the PTTs toward ISDN at a faster pace than their U.S. counterparts (i.e., the Interexchange Carriers [IXCs], Regional Bell Operating Companies [RBOCs], Bell Operating Companies [BOCs], and Other Common Carriers [OCCs]). The PTTs, by implementing ISDN faster and offering more robust services, protect themselves in the upcoming competitive environment of 1992 and beyond. It also positions them better for international and intra-EEC competition in this same timeframe.

Although the Europeans are viewed as further along the curve of ISDN services, it is believed that the more advanced U.S.-based ISDN service providers will equal and, in some cases, surpass their European counterparts within the next couple of years. With the crumbling of regulatory barriers pertaining to where and what telecomm services any particular company can provide, and the driving forces within the commercial world pertaining to where, how, and to whom products and services must be offered, ISDN in the U.S. is just now showing signs of gaining momentum. International Data Corporation (IDC) believes that the growth of ISDN access lines will build from the approximately 200,000 lines installed today to three-quarters of a billion in the year 1995.

SPECIFIC CAPABILITIES AND RESULTING BENEFITS

The ideals of ISDN sound simple. Unfortunately, the implementation of these ideals is complex. The complexities come from the different interpretations of these so-called standard interface definitions and the fuzzy nature of the wide-ranging services. The reality of today's ISDN benefits the user by simplifying the connection to the network and by providing better performance through that connection. The capabilities that are promised through enhanced services and functionality are embryonic and won't be fully realized for some time to come. The leading edge users are just now scratching the surface and are spending a lot of time, energy and money doing so.

End-to-End Digital. Converting our wide area networks to digital provides us with two distinct advantages over the older analog configurations that have been in use since the Bell system was first formed. The first is certainly a reduction in error rates. Digital technology and improvement in media account for error rates in the order of one in one billion bits. By comparison, LANs can push rates as high as one in one trillion. The second is performance. Without digital technology, rates of 64K bit/sec and above are simply out of reach. If one is to prepare for the exponentially higher bandwidth needs of future information systems (e.g., LAN-like wide area network access is already in great demand by many larger corporations), then end-to-end digital is a must.

Although easily overlooked, but very much an influencing factor here, is the fact that all end nodes are digital (or at least are becoming digital). PBXs, computers, PCs, and fax machines, are all based on digital technology. The ease of placing a digital user device on a digital network should not be overlooked in this worldwide network conversion.

Integrated Access. The long awaited integration of voice and data culminates in ISDN. Up to now, the voice world and the data world were only brought together within a transmission scheme. At best, they would share multiplexing equipment. At times, they would share wiring and circuits. Most of the time however, voice and data would go their

separate ways. The processing and information contained within each type of stream still remain very much separated. ISDN is pushing at both ends, driving each of these types of information closer together. Not just by making voice digital and simply putting data through a voice PBX, but rather by causing data and voice to be processed and linked together within a logical system.

Right now, voice call pre- and post-processing represents the most innovative technology within ISDN. The reduction in call set-up time from 20 seconds to three seconds via out-of-band signalling techniques is the most readily apparent benefit of ISDN. Shutdown has also been reduced similarly. These reductions allow not only for reduced overhead in switches and facilities, but also enable the provision of enhanced services like Call-by-Call service, which allows the on-demand allocation of bandwidth for changing needs, and Automatic Number Identification (ANI), which provides information about a calling party to the called party.

ANI allows voice-oriented information (i.e., caller's telephone number) to prompt processing activity within the data center, making both voice and data streams appear before a telemarketing or customer service agent simultaneously, with the voice stream being delivered via a ringing phone and the data stream being delivered via a formatted display screen. The obvious flaw in ANI is that you must call from a known telephone. For example, if you call from home, that's great. If you call from a pay phone in East Oshkosh, Wisconsin, ANI is defeated.

There is also the benefit of integrated access from the perspective of information accessibility. In many ways, by aligning the world's telecommunications networks into one ISDN, services for end-users would become truly universal. No longer would one have to be connected to the right network to gain access to the right information. Now granted, this is the ideal, but it is an intended goal for ISDN. And since ISDN is the most globally influential and potentially pervasive networking technology, it is the logical choice for providing this all-encompassing end-user information access.

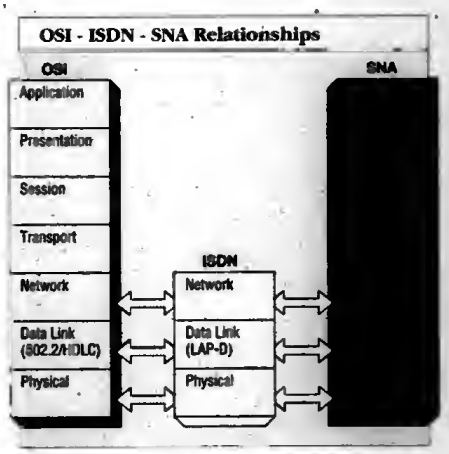
High-Speed Information Transfer. From the outset, ISDN was designed to provide high speed service to the user's desktop. Speed, however, is relative. The 64K bit/sec delivered by ISDN is far faster than what many users had in the past, but far slower than today's 4M and 10M bit/sec LANs.

Fortunately for ISDN, however, most business users are not connected to megabit LANs and home users with their 1,200 and 2,400 bit/sec modems, will benefit greatly from 64K bit/sec. Some examples of others who would benefit are remote sales offices, data entry pools, help desks, and telecommuters. We use the term remote here, rather than distributed, because these locations would be dependent on a remote processor for information. In many ways, ISDN can be labelled for the time being as the poor man's technology, serving best those people who had neither the money nor the internal fortitude for upgrading their local area and wide area networking systems in the 80s. ISDN is, in effect, the technology that allows the trailing edge to play catch up. This is not to say that ISDN is not for the leading edge. With companies like American Express, Chevron, and Boeing investing resources in ISDN, one can be sure that even the most enlightened network gains through ISDN access.

At 64K bit/sec, information transfer can occur about 6 1/2 times faster than at 9.6K bit/sec; 13 times faster than at 4.8K bit/sec, and 53 times faster than 1,200 bit/sec. For a terminal user at a remote location using a PC with a terminal emulator package over a 1,200 baud modem, ISDN is a panacea. Even for those users of high-speed modems, a 64K bit/sec clear digital channel is a great improvement given that most of these modems often fall back to lower speeds over analog lines. Data applications which go beyond file transfer and electronic mail are especially enhanced. With graphic images growing more widespread and application interactivity increasing along with easier to use interfaces, the need for higher speed pipes between processors is expanding exponentially. The popularity of multi-megabit LANs have demonstrated this need for bandwidth.

The speed of B channels won't have an impact on voice performance. 64K bit/sec is the speed at which today's voice conversations occur. However, because of the end-to-end digital aspect of the signal, voice quality will be noticeably better in the ISDN world. Imagine having the same signal quality across the country and the world as you are afforded when speaking with someone connected to the same digital PBX today.

An ISDN B channel does not fully support full-motion video transfer. Video requires bandwidth. A present day television set, if being serviced through digital technology, would require up to a 90M bit/sec bandwidth if uncompressed. The new High-Definition TVs (HDTVs) could easily double that requirement. Today's video codec technologies operate fairly well at 56K bit/sec, but actually achieve full-motion at 384K bit/sec. Certainly, the widespread availability of 64K bit/sec channels will make full-motion interactive video conferencing more easily accessible, but there must be greater improvements in quality before video can really take off at the desktop level. However, knowing that 64K bit/sec will be widely available for desktops makes it easier on companies reaching for better video quality. Instead of worrying about 9.6K bit/sec or lower speeds, the efforts can be aimed at 64K bit/sec, allowing for more focused research and quicker payback upon acceptance. There is nothing like the promise of revenue generation to motivate technology breakthroughs.



CCITT Compliance. All the ISDN equipment and service providers work from the same set of ISDN "Red" books of standards. However, these standards leave a lot to be desired and interpreted. There is no guarantee that one vendor's ISDN equipment will work with another vendor's. As a matter of fact, more often than not, they probably won't. There is little in the way of conformance testing for ISDN products. There is no Corporation for Open Systems (COS) equivalent for ISDN. The North American ISDN Users' Forum serves as a good focal point for user likes and dislikes, but it is not taking responsibility for testing equipment and service interoperability. The trials and the early paying customers best exemplify who works with whom. The RBOCs and AT&T, because of their mediator-like role in ISDN in this

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In the tidy world of diagrams, nobody ever moves to a new office. Or changes jobs. But in the real world, moves and changes create telephone chaos. Where can you find a phone system that puts you back in control? At your local phone company. With advanced Digital Centrex Service provided from the Central Office, you get to control, assign and service your own phone lines. Make your own moves and changes. Right from your own premises. Employees get to keep the same phone number no matter where or how often they move. And you get to keep your sanity. All thanks to the state-of-the-art 5ESS® Switch from AT&T Network Systems. Need a change? Make a move. Call your local phone company.

You and Your Local Phone Companies

AT&T
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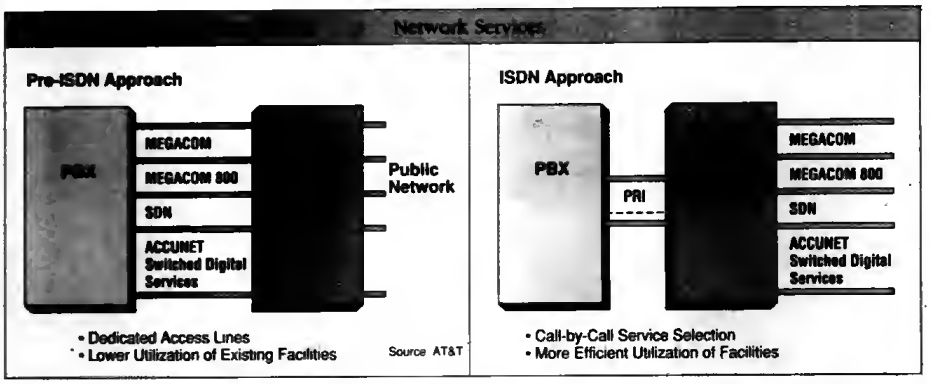

country, keep tabs on equipment being tested within their trial sites. (See box description of Southwestern Bell's ISDN test lab).

So what does one do to guarantee compatibility? Well, in essence, nothing. Customers must at least make sure that products were built to CCITT spec. Vendors of ISDN compatible equipment keep fairly up-to-date lists of other vendors that they work with. Most vendors are trying to expand these lists rapidly. Obviously, the longer your list, the better positioned you are to sell ISDN equipment. Customers should check to view working vendor configurations. Next, check the ISDN telco service provider's list of approved products. As the services come on-line and are tariffed, these lists will become more and more complete. Beyond these items, there is very little guarantee that your bright new shiny ISDN box will work with your new and wonderful ISDN service.

TARIFFS AND AVAILABILITY

Illinois Bell, the first BOC to tariff ISDN services, priced an ISDN BRI circuit at just under $30 a month. Their Centrex lines cost between $15 and $18 per month. Given that a BRI line offers 2.25 times the performance (who knows the potential functionality improvements), a 1.6 times price increase for ISDN BRI is a pretty good deal. It is expected that as other RBOCs tariff BRI, the price range will be between 1.5 and 2.0 times Centrex line pricing. As competition heats up, regulatory barriers crumble, and services become more ubiquitous, this pricing structure could decline even further to where an ISDN BRI line costs the same as today's Centrex line. However, this probably will not happen for at least two-to-five years.

By way of services, AT&T prices its PRI service at $400 per month, with a $3,000 installation charge. Their INFO-2 service, AT&T's ANI offering, is priced at two cents, which decreases to one cent for each call above 60,000 per month. That is, each caller's source number is provided to the receiving party for two cents per call. ANI is the current driving force behind all pre-processing of caller information.

APPLICATIONS

Telemarketing. The two primary examples of telemarketing applications are used by two of the earliest customers of AT&T's ANI service: American Express and American Transtech. American Transtech is one of the largest telemarketing companies in the U.S., and just happens to be an AT&T company. Both companies utilize information provided over the D channel to direct access to databases of information about a caller prior to talking with the customer. The look-up of the caller's information and the presentation of the information to the service agent occurs in parallel with call set-up to the agent. This processing takes place in milliseconds. The delay is not apparent to you or the agent. As a matter of fact, because of the efficiencies of the newer switches and facilities, all this additional processing activity could easily occur in less time than it would take for non-ISDN technology to simply complete a call. The productivity of the agent is enhanced and customer satisfaction increases. Both contribute toward more sales and repeat business.

At American Express, the process goes like this: a Gold Card member has a question about his or her account. They call their 800 number for client service. Prior to the phone ringing at the customer service agent's desk, caller information is received through the D channel by an AT&T PBX. Through a PRI interface, that information is passed to a computer system running a database application that matches the caller's data against their American Express history. Processed information, such as a copy of the latest bill, a list of outstanding charges, and some background on the account, is then routed to the service agent's terminal. That agent then picks up the ringing phone. Remember, this pre-processing takes literally fractions of a second and would be completely transparent to the caller.

Corporate Networks. In an age where individual company networks are being organized into one large corporate entity, it makes sense to have everyone talking the same language and having access to information wherever it may be. For years, many larger organizations have found themselves in the uncomfortable position of having to invest in and operate their very own telephone company in support of internal telecommunications needs. Through privatization and the growth of hybrid networks, corporations have taken on much more responsibility where their networks are concerned. In many cases, this responsibility has overwhelmed those within corporations ultimately responsible for such networks. IDC's research has indicated for some time that networking advancements have outstripped the ability of corporations to operate, manage, and plan them effectively. Given the shortage of staff and expertise and given the rather slow pace of intelligent network management systems development, this gap will only grow larger over the next few years. In this situation, IDC believes it makes perfect sense to offload a certain amount of network responsibility onto companies that specialize in the design, delivery, and management of networking equipment and services. This frees up resources that are better utilized when directed at primary business activities, such as manufacturing widgets, curing the sick, managing money, or

flying planes. This is not to say that corporations should abandon networking concerns nor should they abandon their private networks. Rather, if ISDN is to provide intelligent services, then it is our responsibility to take advantage of this intelligence where appropriate, not try to reinvent our own.

Over the next five years, corporations will grow to realize that hybridization will principally involve mixing specialized private equipment with general-purpose ISDN public services.

Role in Government Networks. The government, mostly through the National Institute of Standards and Technology, is probably the biggest proponent of standardized networking technology. Witness the commitment to and effort involved in the FTS 2000 procurement, which was to date the single largest telecommunications project ever. Since ISDN is one of the two or three most influential standards in networking today, the defense and public agencies of the government would be well advised to start building toward ISDN. Network equipment purchased for use beyond three-to-five years (i.e., everything in the government) should be ISDN compliant. Due to their more demanding requirements for interoperability among very large organizations, the Department of Defense specifically should be aggressive in preparing itself for a combined voice/data/video wide area network comprised of ISDN equipment and services. Also, since many government installations utilize Centrex, those organizations will, in many ways, be best positioned to become ISDN customers within the next couple of years.

As far as applications are concerned, it is not readily apparent how applicable the early work in ISDN will be for the government. After all, the government is not in the telemarketing business. However, significant gains in performance and efficiencies will be made by simply utilizing the digital high-speed capabilities of ISDN public facilities. Considering much of the government's networking technology is based on older analog facilities and equipment, the technology of ISDN is viewed by much of the commercial world as being already available and will actually be quite a welcome upgrade for many government networked systems.

The aspect of security is also one that should not be overlooked. A more intelligent network is also able to be a more secure network. Things like out-of-band signalling allow for more intense scrutiny of traffic while eliminating the overhead and performance penalties usually associated with such scrutiny. Also, the software orientation of switching technology associated with ISDN provides a more flexible environment for implementing security features. An old hard-wired switch is not an easy thing to upgrade. A new ISDN processor will be much easier to tailor for specific requirements within different sectors of the government.

THE FUTURE

Timeline for Adoption. There are really two waves associated with ISDN acceptance and implementation. The first involves those companies with a large stake in consumer service. Any company that makes money by servicing a large client population should begin the process of ISDN implementation. American Express and American Transtech have broken new ground over the past year. Companies with a similar orientation should plan to make their own investment in ISDN within the next two years. Failure to make a commitment to ISDN within two years will result in a company being significantly behind in the service game.

The second wave of ISDN utilization involves companies that would benefit from the non-application (i.e., lower level functional) gains realized by ISDN. Many of the early paying customers of ISDN (e.g., Chevron Information Technology Co., Tenneco, Inc., West Virginia University, Apollo Computer and Boeing Computer Services Co.) fit into this category. These companies are consolidating their voice and data networks, upgrading their facilities to higher bandwidth and digital capabilities, building greater flexibility into their wide area networks, taking a more enterprise-wide approach to networking and/or adding new premise equipment into their networking scheme. These companies presently derive little benefit from ISDN as a new-wave application platform. Instead, these companies will simply take advantage of ISDN as a provider of a flexible, digital, high-performance, and intelligent network technology. For organizations looking for similar gains in networking, implementation should spread out over the next six years. The early adopters will be those with less investment in distributed processing, LANs, and intelligent premise-based WAN management systems. Current users of Centrex are almost ideal candidates over the next two years. Beyond 1995, there will be few reasons not to make use of ISDN within some segment of an organization's network. The service will be that mature and ubiquitous.

Future Directions and Applications. Already basic specifications are established for BISDN. It is said that BISDN will be the real driving force behind ISDN technology acceptance and utilization. Because of the advancement of other technologies (e.g., LANs, value added networks, T-1, and T-3) and because of the tardiness of the initial ISDN products and services, the higher bandwidth and even more advanced services available within BISDN are viewed by larger and more sophisticated user organizations as the "real" ISDN. The Japanese have been very aggressive in preparing for BISDN. They are not necessarily ignoring today's standard ISDN, but rather, minimizing their commitment to it in light of the benefits of the higher speed BISDN.

Presently, ISDN's orientation toward the business market and limited availability restricts its ability to deliver on its promised worth. ISDN will finally deliver on all its promises and reach its full potential when the service becomes ubiquitous and reaches into the home. Technology, accessible through the home, is not nearly as sophisticated as that which has spread throughout large, medium, and even small businesses. Whereas businesses may need to fully justify the displacement of already sophisticated technology, the home user has only to displace an analog telephone set and maybe a PC modem. And the services offered to the home, such as call forwarding, video telephony, voice/data mail, and videotex, are some of the most exciting for ISDN. △

ISDN User Profile

Nice Corporation
A 2,000-agent telemarketing company

Task at Hand
Processing more calls and decreasing the time spent on each order

Solution
ISDN Primary Rate Interface to transmit and receive customer data

Result
Dramatic reduction in $5,000 per month 9.6 bit/sec leased line

Savings
Millions of dollars annually

Real-World ACD.

Better service? Everyone salutes the idea. But in the real world, how do you make it fly? For the airline industry, the answer comes from their local telephone company. Using AT&T Network Systems Automatic Call Distribution (ACD) equipment, local telephone companies can provide airlines with a better way to answer their customers' calls. The incoming calls of their most important customers fly non-stop to their most experienced agents. And calls from less frequent flyers? They're answered quicker too. ACD programs can help airlines land more customers. See how they can help your business take off. Call your local telephone company.

You and Your Local Phone Companies

AT&T Network Systems

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DATA STREAM

Elizabeth Horwitt

Gorging on product soup

Late January/early February is always a hot time for networking announcements, but this year's onslaught has passed all bounds, to the point of giving users, analysts and us poor journalists a massive case of new product indigestion.

If you take simply the quantity of introductions as a measure of an industry's health, it would seem that the networking market — or at least certain sectors of it — is in very good shape indeed.

The haste with which vendors are fielding their major artillery this year undoubtedly reflects the number of Fortune 500 companies that are in the process of implementing corporatewide network systems, which they hope will continue to meet their needs through the next decade.

However, the present deluge of announcements is far from an unmitigated blessing to the communications managers who have the difficult job of designing such systems. True, many of these introductions address some of the key areas of enterprise networking, such as network management and LAN-to-WAN connectivity.

But managers are already struggling to match their companies' networking needs against

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Fiber to ease bandwidth rut

BY JOANIE M. WEXLER
CW STAFF

The recent avalanche of Fiber Distributed Data Interface (FDDI) product announcements could be a thumbs-up sign to high-bandwidth users who are anxious to relieve some of their communications bottlenecks with fiber.

FDDI is an emerging standard specifying a 100M bit/sec. local-area network running over fiber-optic cable. The network is configured in a dual, counter-rotating ring topology that provides network redundancy.

The primary application for FDDI has been as a high-speed backbone linking lower speed networks.

As the price per connection drops, however, FDDI should catch on as a high-speed LAN in its own right — to accommodate, for example, powerful workstations that share data on a ring.

"There is a mismatch between the power of workstations and the speed of communications links [that FDDI can alleviate]," noted Martyn Roetter, director of telecommunications and computer systems at Arthur D. Little, Inc., a consulting firm in Cambridge, Mass.

Prior to this year, a smattering of FDDI products was available from a few vendors, but many users have been awaiting the completion of the final component of the standard, Station Management, or SMT, to ensure that their multivendor FDDI products will interoperate. SMT specifies the management of the LAN attachments and fiber cable.

The current version of SMT — Revision 6.0 — will be discussed at next week's standards committee meeting in Austin, Texas, and will either be voted on or revised for a vote at the group's April meeting.

FDDI

If last week's release of a portable SMT product by Synernetics, Inc., a North Billerica, Mass.-based start-up company, is successful, users might feel more secure that the products they install will, indeed, interoperate.

Dubbed Component SMT, the software complies with Revision 6.0, and the company plans to peddle it to vendors of FDDI hardware, thus ensuring that multivendor products incorporate a consistent interpretation of the SMT standard.

The following were among the recent hardware announcements:

- An FDDI bridge from Fibercom, Inc. that reportedly filters 500,000 packet/sec. and forwards 20,000 packet/sec. while interconnecting FDDI LANs with Ethernet, Token-Ring and other FDDI LANs.

The Ringmaster 7200, priced at $60,000 for a unit with four network interfaces, are slated to ship during the second quarter of 1990.

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Pan Am readies integrated data network for takeoff

ON SITE

BY JOANIE M. WEXLER
CW STAFF

After years of suffering financial operating losses and rethinking its corporate information systems strategy, Pan American World Airways is finally about to get its integrated data networking platform off the ground.

Pan Am's bumpy financial ride has caused the information-intensive company to question, among other things, the wisdom of operating three incompatible data networks. In moves that could be viewed as playing catch-up to modern IS thinking, the airline is now "looking at telecommunications as a strategic corporate resource," according to Al Castan, system director of communications at Pan Am.

By consolidating networks and equipment, Pan Am hopes to slash its operating expenses in a time that is financially critical for the company. "In 1989, Pan Am World Airways will [have lost] over a quarter of a billion dollars operating in a year that's pretty good for the industry," noted Edward Starkman, an analyst at Paine Webber, Inc. in New York.

One component of the airline's overall strategy is a multinational X.25 packet-switched network that will be provided over the next 18 months by Racal-Milgo, based in Sunrise, Fla., under terms of a $2.5 million contract signed in December. The packet network, which will replace disparate Synchronous Data Link Control (SDLC), Teletype 83B3 and Airline Link Control networks, is slated to include nodes in 11 nations.

Racal-Milgo will provide a turnkey system for Pan Am, integrating multiplexers, modems, network control, software and hardware for the airline.

While the integrated network may not relieve all of Pan Am's financial woes, it should help reduce direct operating costs, which are high in incompatible networking environments, Castan said. The company hopes to recoup its $2.5 million X.25 investment in less than a year through operational savings, according to Robert O. Wagner, vice-president of information services.

Pan Am began planning the new architecture four years ago but had not implemented it yet because "we don't have the R&D funds to be on the leading edge of technology," Wagner said. "But we're going to be fast followers."

He said Pan Am is following in the footsteps of competitors Delta Airlines and Japan Airlines, which be said have had X.25 networks installed for less than a year, and that American Airlines is in the process of installing one.

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Congress urged to take telecom role

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — Congress must take charge of U.S. telecommunications policy, which affects the very nature of U.S. business and society, before the opportunity to shape the information age slips away, warned the congressional Office of Technology Assessment (OTA) in a report issued last month.

The lack of strong government leadership will hurt U.S. businesses, which depend on networks for competing in global markets, and squander the opportunity to use new technologies for social good, said the OTA's "Critical Connections" report.

Unless the government takes action, current trends will lead to a wider gap "between those who can access communications services and use information strategically and those who cannot," the OTA said. In other words, the poor, the undereducated and the isolated will not benefit from the information age.

The OTA said this "equitable access" problem is caused by several factors, including reduced telecommunications subsidies for residential users, the high cost of information retrieval and the lack of technical skills or low-cost navigational tools.

Revenue drain

In addition, the OTA said that the rise of private networks — built by corporations dissatisfied with the public telephone network —could drain the revenue needed to modernize the public network for the remaining small-business and residential users.

The OTA noted it is uncertain whether corporations will continue to bypass local exchange carriers at the present rate. But if the pace of privatization continues, "a spiraling effect might take place, whereby the lack of investment in the public network could lead to greater bypass and unbundling," the OTA said. The bypass and investment issues are also topics of a study under way at the National Telecommunications and Information Administration [CW, Jan. 22].

The nonpartisan OTA offered various policy options but did not make specific recommendations. For example, it suggested that Congress could establish a national telecommunications policy, perhaps with the help of a national commission or joint congressional committee, and then create a new agency (or pick an existing one) to carry out the policy.

The Communications Act of 1934 has not been updated to reflect rapid advances in technology, the OTA noted, while the current policy-making process is split among several agencies and a federal court with disorderly results.

"If Congress fails to act decisively, the opportunity to make deliberate choices about new communication technologies will be overtaken by rapid technological advances, the hardening of stakeholder positions and alliances and the force of international developments," the OTA concluded.

Horwitt

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a mishmash of existing products. A new influx of announcements merely adds to this soup — and to the work load of those who must make sense out of the confusion. It's just not worth the trouble to take the new products into consideration unless they clearly add something useful to the pot.

Sometimes you can tell a new product is useful just by hearing about it. However, networking vendors' claims are often difficult to prove or disprove until you actually have a product up and running. And what do you do if everyone claims to have approximately the same set of capabilities?

Take LAN-to-WAN interconnections. During the past year, bridges have assumed the intelligence of routers, while routers took on the protocol-transparency of bridges. At last week's Comnet '90 show, vendors were trying to one-up each other by boosting their products' throughput and adding support for hot networking protocols such as IBM's Advanced Peer-to-Peer Networking, Fiber Distributed Data Interface and Token-Ring (Ethernet is already a given for most offerings). Another popular move was to provide network management services, usually via the Simplified Network Management Protocol. Who's to judge which interconnectivity device is the fastest, most flexible and best managed?

Integrated network management is another crowded arena — a bouillabaisse, if you will, that keeps attracting new cooks. Network managers already are complaining about the task of distinguishing between AT&T, IBM, DEC and HP offerings, all of which promise to manage everything but the kitchen sink. They may be less than delighted that three additional entries — two new and one resurrected — appeared at Comnet last week.

Ameritech and Nynex took up the regional Bell operating company network management banner that US West dropped when it sold its management workstation to IBM.

Also, Avant-Garde demonstrated an enhanced version of Net/Command, one of the oldest multivendor network management systems around, under the Boole & Babbage banner (B&B acquired Avant-Garde last year).

The irony is that all three of the above vendors bring unique strengths to the network management arena. Nynex's systems integrator background should come in handy when it comes to tailoring management applications to a particular customer's mix of networking equipment.

Ameritech's joint developer, Westinghouse, reputedly has put together one of the most sophisticated and intelligent network administration systems in existence over the past few years and furthermore has firsthand experience about what a big corporation really needs from a network management system.

Avant-Garde has had more time than most to learn how (and how not) to develop a multivendor management system. In addition, its Net/Command product, oriented as it is toward managing physical networking devices, could mesh well with Boole & Babbage's system for monitoring logical host networks.

All the same, if I were a communications manager, my first reaction would be, "Who needs these guys? I've already got enough on my plate!" If LAN-to-LAN interconnectivity tools seem to be growing too much alike, at least they have a finite number of capabilities and features that are mostly available and thus can be tested and compared.

Unfortunately with network management platforms, we are often dealing with "concepts" and "futures" that are unlikely to turn into usable products for a year or two. How the devil do you competently evaluate a future — particularly when your company wants multivendor management now?

Horwitt is a *Computerworld* senior editor, networking.

Mellon Bank tiptoes into ISDN

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C.— Ever so cautiously, Mellon Bank in Pittsburgh is exploring the use of Integrated Services Digital Network (ISDN) for voice, data and video transmissions in hopes of gaining a competitive advantage in customer service.

For example, Mellon plans to test a "desktop conferencing" application this year, which would allow a bank employee and a customer to view and change data simultaneously on their respective computer screens, while discussing the customer's account on the telephone.

Mellon's plans for ISDN were outlined at the 1st Annual Industry/User Conference on the Business Case for ISDN, held late last month.

Money matters most

John W. Matthews, product design manager in Mellon's cash management department, described "the ISDN applications that Mellon is currently looking at without ever taking our eyes off the bottom line."

"As an old techie, I look at ISDN and say really, really interesting technology. My boss looks at ISDN and says, 'Explain the part about what it does for us again,' " he said.

Mellon has already developed what Matthews called the first "island-to-island ISDN linkup," which is essentially a circuit between the telephone company central offices in Pittsburgh and Philadelphia. He said the ISDN link could be used for videoconferencing, as well as to replace Mellon's present T1 backbone network between the two cities for high-volume data transmissions.

"It may in the foreseeable future be more cost-effective to use usage-based circuits than to pay monthly rentals [for the T1 circuit]," Matthews said.

The ISDN equipment, circuit and related computer hardware and software were all loaned by vendors, including MCI Communications Corp. and International Computing Ltd. By getting such vendor loans, Matthews said, "we are able to begin the search for 'problems' that ISDN can in fact really solve."

He stressed that it is the cash management department, not the information systems department, that is exploring ISDN. The IS department is excited about possible cost savings and speed improvements from ISDN, but Matthews said he is exploring ISDN to see if it can be used to repackage existing cash-management services and differentiate those products, for example, with better customer service.

A bank's cash management department typically provides large corporations with collections, disbursements, reporting, electronic funds transfer and, increasingly, electronic data interchange services.

Matthews said Mellon will test the ISDN desktop conferencing application in the second quarter of this year. He said a Mellon customer service representative and a customer — both viewing the same data at the same time — will be able to point to any part of the screen, annotate data and change data while they discuss it on the telephone.

One application for ISDN conferencing is on-line problem resolution, he said, which is expected to reduce the time and cost of resolving customer problems. "On the downside, the undetermined cost of ISDN makes it extremely difficult to accurately calculate a cost-benefit analysis" for the pilot program, Matthews added.

ANI bargain

Another application to be explored is the use of automatic number identification to expedite processing of incoming calls. Matthews said Mellon could save about 10% of its $500,000-a-year WATS bill by reducing the length of calls.

"From a business standpoint, the [automatic number identification] feature is very attractive once the social concerns with this part of the ISDN package have been resolved," Matthews said [CW, Feb. 5].

In addition, Mellon is interested in using ISDN to transmit images of customer's checks back to customers for verification. Sending a 64K-byte graphic image at 2,400 bit/sec. would take between three and four minutes, he said, whereas the same transmission would take only about eight seconds on a 64K bit/sec. ISDN line.

"ISDN is really exciting technology. And it's really not a question of whether or not we implement ISDN systems — it's a question of when," Matthews said. "We need the carriers to move quickly to expand ISDN and its tariffing."

Universe switch offers a world of redundancy

BY SALLY CUSACK
CW STAFF

SHELTON, Conn. — Touting the product's configurability and compact design, Data Switch Corp. recently introduced a T1 matrix switch with redundancy features.

The Universe switch reportedly offers a distributed communications architecture that provides unlimited distance and metropolitan-area separation between front-end processors and modems.

According to Mark Leary, director of communications research at International Data Corp., a market research firm in Framingham, Mass., Universe may not be the most "whiz-bang" technology on the market, but it provides a cost-effective, practical product for users in traditional IBM hierarchical Systems Network Architecture environments.

The product offers T1 circuit switching, intelligent T1 multiplexing and Digital Access and Cross-Connect System capabilities. Customers can locate lines at distances up to 16,000 feet from the central switching cabinet with standard fiber optics, and remote switching capabilities are accommodated via T1 or CEPT1 lines, according to Data Switch.

In step with the current trend toward space-saving techniques in the data center, Universe supports as many as 4,096 ports in any-to-any switching configuration.

Through a Fiber Satellite Unit component, lines, monitor and test ports may be combined and located remotely in groups of up to 64 in any standard 19-in. modem rack.

This allows the user to eliminate the cost of additional cabling and switching cabinets and to conserve existing floor space by placing small groups of lines in existing modem or multiplexer racks for connections via fiber cable to the matrix switch. Scheduled for availability in April, the switch will be priced at approximately $320 per port.

Sweet Liberator

In a separate announcement, Data Switch unveiled the Liberator, a remote switching unit designed to connect older, third-party switches to a Data Switch central switching cabinet. The product is said to support the IBM Model 3728, the Bytex Corp. Autoswitch 240 and 280 and the Bytex Unity 10 and 30, as well the Dynatech Communications, Inc, CTM series. According to Linda Bachman, a spokeswoman for Data Switch, the Liberator will provide cost-effective front-end processor sparing, universal monitor and test access capabilities as well as increased port availability. The product will also offer support for higher speed lines.

Each Liberator unit can be configured with as many as 64 ports, and each costs about $320 per port. It is scheduled for delivery in the third quarter.

FDDI's coming of age

The Fiber Distributed Data Interface (FDDI) standards committee has been meeting since 1982 to put in place a high-speed, fiber-optic local-area network.

A few vendors have risked releasing FDDI products without the standard firmly in place by promising free software upgrades to the evolving final portion of the standard, Station Management.

Other than the fact that Station Management is currently on the brink of being completed, which gives users the reassurance that FDDI-compliant products now on the market should then be interoperable, industry analysts said there are a few other driving factors making the timing right for the many FDDI products that are currently springing up in the marketplace:

- The trend toward internetworking in large companies. The waning 80/20 rule, where 80% of network traffic generally remains on a single LAN and only 20% travels between LANs, is shifting to a larger percentage of inter-LAN communications, requiring high-speed backbones in more applications.
- Interexchange carriers are currently running fiber to the business premises at 45M bit/sec. (T3) speeds, which results in the need to take advantage of the higher speed communications link.
- Pressure from workstation users and vendors who do not see the point of high-speed — and high-priced — workstations whose networked speed is curbed by the rate of the transmission link.
- IBM and Digital Equipment Corp. have announced that they want to supply an FDDI LAN to connect their processing systems — and they are a big force in the marketplace.

JOANIE M. WEXLER

Fiber

FROM PAGE 63

- Interphase Corp. unveiled a reduced instruction set computing-based 6U Motorola, Inc. VMEbus node processor, the V/FDDI 4211 Peregrine, for FDDI networks. The 6U dimensions allow the product to fit into smaller computer systems, which cannot necessarily accommodate the larger 9U size.

Scheduled to ship in March, the product can reportedly implement an FDDI single-attached station ($8,995) or a dual-attached configuration ($10,995).

- Network Systems Corp. is offering its $31,500-$60,500 DX4000 FDDI/Host Controllers, which link IBM mainframes, Cray supercomputers, Digital Equipment Corp. minicomputers and VMEbus workstations to FDDI LANs.
- In-Net Corp. announced the availability this month of a 4M bit/sec. Token Ring-to-FDDI bridge, the Fibertalk 5000, priced at $22,000.
- Racal-Quanta announced plans to provide FDDI-based interconnections for its Premnet Fiber Optic Distribution Systems.
- CMC announced general availability of two 9U VMEbus FDDI network interfaces. The dual-attached CMC-1056 reportedly processes up to 30,000 packet/sec. and costs $9,950, while the single-attached CMC-1055 is priced at $8,950.
- Wellfleet Communications, Inc. has announced a VMEbus-based FDDI interface for routing multiple protocols in backbone LAN-to-LAN and LAN-to-WAN applications. The product is scheduled to ship in the second quarter.
- Proteon, Inc. has announced a June ship date for its P4200 FDDI router, which it demonstrated at Interop '89 in October. The product is priced at $26,000.

According to Roetter, "it seems that the FDDI market has reached a point where people are announcing products, but complete systems are still embryonic. Users should make sure their vendor has a systems capability and isn't just pushing individual pieces of hardware."

AT&T launches into Comsphere

BY ELLIS BOOKER
CW STAFF

AT&T Paradyne last month took the first step toward coordinating the modem and network management systems of Paradyne Corp. — which AT&T acquired and made a subsidiary last March — and AT&T's Dataphone II line. The company said its new data communications architecture and network management scheme, dubbed Comsphere, will encompass all existing and future products.

The Comsphere 3400 and 4400 series of leased-line modems can be programmed with any of three diagnostic protocols: AT&T Paradyne's Analysis, Dataphone II and Comsphere 6800 series network management systems. Both support data rates of 2,400 bit/sec. to 19.2K bit/sec.

The new modems are available in two families. Model 1 modems support the old Paradyne diagnostic protocol, DMC, and its Analysis 6510 network management system. However, these modems can be upgraded with a hardware "personality module" that enables them to work with the Comsphere 6800 Network Management System, AT&T Paradyne said.

The Model 2 modems support the Comsphere protocols, as well as the Dataphone II diagnostic protocol.

While the basic 3400 Model 1 will not work with the Model 2 unless upgraded, AT&T Paradyne officials said this incompatibility would not bother most users, who tend to have either Paradyne or Dataphone II modems exclusively.

What the new line offers, company officials said, is the option to eventually consolidate all modem resources under the Comsphere 6800 Network Management System. The Unix-based network management system can run as an element under AT&T's Accumaster Integrator network management system via AT&T's Network Management Protocol.

A significant addition to the Model 2 line is an optional feature supporting a diagnostic interface directly into IBM's Netview network management system. AT&T has proposed its Unified Network Management Architecture as the superior network management approach to IBM's.

"We've done this because customers have asked us to," said John Miller, executive vice-president for product business units. Miller added that the modems support the LPDA-2 protocol and also interface with Cincom Systems, Inc.'s Net/Master host-based network management product.

AT&T Paradyne also unveiled an intelligent communications carrier, the Comsphere 4000, for which it promised future software that will support digital bridging and routing of data communications equipment interfaces to a variety of unannounced "application modules."

According to AT&T Paradyne, the carrier features an intelligent, matrix-switching backplane based on a proprietary AT&T Paradyne bus. When activated by future software, the carrier will be a universal access carrier for both leased-line modems and future digital products, the firm said. For example, customers will be able to plug in a future two-wire, dial back-up "module" that all the data communications equipment connected to the carrier will be able to share. The carrier currently supports up to 16 modems and 16 one- or four-port multiplexers.

"... In terms of leads generated per dollar spent, Computerworld Response Cards give us the greatest cost efficiency."

— Rogers Faden
President
cfSOFTWARE

Having enjoyed 40 per cent growth the past couple of years, cfSOFTWARE has found its niche marketing two unique communications solutions in the IBM and IBM-compatible arena. Across-the-Boards, a standard application programming interface, and pcMAINFRAME, a file transfer system, both enable mainframes and microcomputers to talk to one another.

According to Rogers Faden, President of this Chicago-based company, targeting users whose applications require this type of cross-communication is key to their continued success.

"Computer and applications managers within mainframe shops, as well as developers at software companies and mainframe installations, are our primary audience. We know that Computerworld is the publication that delivers our message to the greatest number of mainframe sites we need to reach. That's why we advertise in Computerworld Response Card Decks.

"Overall, card dech advertising is a cost-effective way to generate inquiries with fast, easy turnaround. And we've found that especially true with Computerworld Response Cards. In fact, in terms of leads generated per dollar spent, Computerworld Response Cards give us the greatest cost efficiency.

"And unlike some other decks whose leads are often worthless, Computerworld Response Cards consistently generate high quality leads. Leads that help us achieve our most direct goal of converting serious inquiries into sales.

"Experience tells us that Computerworld Response Cards deliver the greatest depth of coverage within the organizations we're targeting. And that increases our chances of reaching all the right people — every time. In the foreseeable future, Computerworld Response Card Decks will definitely continue to be an important part of our advertising plan."

Computerworld's Direct Response Cards give you a cost-effective way to reach *Computerworld's* powerful buying audience of over 133,000 computer professionals. They're working for cfSOFTWARE — and they can work for you. Call Norma Tamburrino, National Account Manager, *Computerworld* Direct Response Cards, at (201) 587-0090, or (201) 587-0297 to reserve your space today.

COMPUTERWORLD
DIRECT RESPONSE CARDS

Pan Am

CONTINUED FROM PAGE 63

Castan explained that the choice of the packet network was made because Pan Am is an international firm that needs a network easily supported in locations all over the world.

The wide-area network will link what the company calls its "airports of the future," which will comprise Token-Ring local-area networks supporting more than 10,000 personal computers containing Intel Corp.'s 80386SX chip, IER, gate readers and baggage tag and SCI ticket printers to automate every point of contact between passenger and airline.

The company's goal, Castan said, is to significantly reduce the amount of time a passenger waits in line. To that end, the printers will generate tickets and boarding passes with magnetic strips containing passenger and flight information, providing a "continuous audit trail" for the check-in function.

Castan explained that the attributes of the packet-switching network should also contribute to the goal of reducing customer waiting time. For example, if a circuit goes down, the network will automatically reroute, obviating the need for manual ticketing or boarding procedures.

Starkman did describe Pan Am's Panamac reservation system as "not even in the same league" with Covia's Apollo or American Airlines' Sabre computer reservation systems (CRS), which tie travel agency terminals directly into one or more airline reservation systems, making it faster for travel agents to match available flights with customers' various travel needs.

While Pan Am will still lack ownership in a CRS, its network will provide links to other CRSs, such as Sabre, as well as to public packet-switched networks. "The cost of becoming a CRS is very large. That's not where we're looking to be by ourselves," Castan said.

Tandem division strings together pieces of Intelligent Network

BY ELLIS BOOKER
CW STAFF

PLANO, Texas — Tandem Telecommunications Systems, Inc. recently introduced three products that are the first to completely address the Intelligent Network concept, according to company officials.

An Intelligent Network architecture uses databases and out-of-band signaling mechanisms like Signaling System 7 (SS7) to manage and create new voice and data services on public telecommunications networks.

Tandem Telecommunications unveiled a multifunction service control point, an on-line network management system and a fourth-generation language for creating new applications in SS7 environments.

"For today's laboratory environment, a stand-alone [service control point] is fine. But unless you worry about how you're going to manage systems that involve powerful, large-scale databases and many network elements, you haven't planned for success," said Tandem Telecommunications President Chris Erickson.

Unlike current service control points, which Erickson said are typically designed for specific applications, the Tandem Telecommunications platform will be able to handle multiple jobs, from routine line information database applications to virtual private network services.

For its service control points, Tandem Telecommunications uses the fault-tolerant computers of parent Tandem Computers, Inc. For applications development, Tandem Telecommunications relies on partnerships with the likes of US West subsidiary Applied Communications, Inc. in Omaha, Neb. Applied Communications said it had been selected by U.S. Intelco Networks, Inc., a consortium of some 300 independent telephone companies, to provide a calling card and line information database applications using Tandem Telecommunications equipment for its SS7 network, scheduled to go into operation this spring.

Erickson said he believes Tandem Telecommunications has a leg up on competitors such as Ericsson Network Systems and DSC/Digital Equipment Corp., both of which also have announced plans for service control point systems, because it already has service control points in place.

A year and half ago, Tandem Telecommunications placed three such systems in U.S. Sprint Communications Co.'s network, where they process 400 transactions per second in a credit-card-authorization application over Sprint's SS7 fiber-optic digital network.

NET clears compatibility hurdle

Network Equipment Technologies, Inc. has announced that its Integrated Digital Network Exchange (IDNX) Transmission Resource Manager has passed compatibility testing with the Integrated Services Digital Network (ISDN) Primary Rate Interface on **Northern Telecom, Inc.'s** Meridian SL-100 private branch exchange. Compatibility will allow SL-100 users to tap into the ISDN wide-area networking capabilities of an IDNX digital network.

Digital Equipment Corp. is offering a trial program with a money-back guarantee for three personal computer-to-VAX connectivity packages. The Pclanmark program reportedly offers users a 60-day trial at special prices through June 30 and provides four hours of telephone support for over 30 networked PC applications.

U.S. Sprint Communications Co. has announced Safe Block, a long-distance service for correctional facilities that will automatically debit special phone accounts set up for inmates when they call preapproved phone numbers to lower prisons' telecommunications costs, according to Sprint.

The Corporation for Open Systems International (COS), an organization working to accelerate the introduction of interoperable, multivendor products and services, has gained **Pacific Gas and Electric Co.** as a member. COS President Lincoln D. Faurer has also announced the appointment of COS Chief Operating Officer Stephen A. Hudson, who previously served as a principal in the Government Systems Group at Booz, Allen & Hamilton, Inc.

Nynex Corp. recently joined the **OSI/Network Management Forum**, an organization devoted to speeding the implementation of Open Systems Interconnect (OSI) standards and allowing network management systems to work in multivendor environments.

The EDI Council of the U.S.A. (EDICUSA) and the **North American International EDI Users Group** (NAIEUG) have merged, giving EDICUSA "the benefit of an international focus so important to the EDI user communities right now," according to EDICUSA Chairman Vinnie Calandra. The combined group includes about 350 individuals as members.

Users of **DEC's** Local-Area Transport (LAT) protocol reportedly can now extend directly into other operating environments because of a recent **DEC/Gandalf Data, Inc.** agreement. Gandalf will reportedly offer LAT with its Starmaster network processor, allowing LAT users and hosts to connect to resources and users in Systems Network Architecture, Novell, Inc. and Transmission Control Protocol/Internet Protocol network environments.

NEW PRODUCTS

Network management

Xcellenet, Inc. has combined network management and diagnostic tools in the Xcellenet Wide-Area Network (WAN) Management System, an integrated software package that incorporates the graphical user interface of Microsoft Corp.'s OS/2 Presentation Manager. The three-module package manages a nationwide WAN through public dial-up telephone networks.

The configuration and management module runs under OS/2 Presentation Manager on a personal computer containing an Intel Corp. 80386 microprocessor. The product targets users needing to manage a network of 50 or more locations. Host-based pricing ranges from $11,995 to $16,995, depending on number of users, plus $210 per node.

Xcellenet
Suite 700
1800 Century Blvd.
Atlanta, Ga. 30345
404-982-9900

Network services

A commercial Transmission Control Protocol/Internet Protocol (TCP/IP) internetworking service is being offered on an international basis by UUNET Communications Services, Inc.

The service allows companies, educational institutions and nonprofit organizations to share UUNET's private TCP/IP network primarily at 56K bit/sec. speeds. It targets organizations that want their own corporate network but cannot afford to install their own dedicated lines, according to the company.

A 56K bit/sec. dedicated connection costs $1,000 per month in addition to the telephone company's charge for connection to Alternet's local hub. In limited areas, 9.6K bit/sec. connections are available, with prices starting at $250 per month.

UUNET Communications Services
3110 Fairview Park Drive
Falls Church, Va. 22042
703-876-5050

Customer-premises equipment

Enhanced Systems, Inc.'s Hello! voice automation system and Callsort call accounting software will now operate in tandem in a single personal computer-based system. The Hello! modules include voice messaging, automated attendant and a multilevel audiotext menu system, with facsimile integration and mainframe and database links available.

Callsort tracks incoming and outgoing telephone activity, measuring the availability and efficiency of each telephone trunk and permitting managers to verify phone charges.

Callsort is priced from $395, depending on the number of extensions supported, and Hello! prices start at $6,000. The systems require an IBM Personal Computer AT or compatible with 1M byte of main memory and 10M bytes of hard disk storage.

Enhanced Systems
6961 Peachtree Industrial Blvd.
Norcross, Ga. 30092
404-662-1503

Links

A 30% price cut for Intel Corp.'s Connection Coprocessor personal computer facsimile board drops the retail price from $995 to $695. In addition, the vendor has announced that customers who purchase the product by June 30, 1990 are eligible to receive Alien Computing's Faxit for Windows at a cost of $19.95, which usually retails for $179.95.

The Connection Coprocessor price cut applies to both the PC AT-bus and Micro Channel Architecture versions. In addition, the vendor has lowered the cost of the product's optional 2,400 bit/sec. piggyback modem from $295 to $195.

Intel
Personal Computer
Enhancement Operation CO3-7
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Hillsboro, Ore. 97124
503-629-7354

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* The Wall Street Journal (1987) — "Survey of the Information Processing Marketplace."
* The Adams Co. (1988) — "Information Systems Management Study."

MANAGER'S JOURNAL

EXECUTIVE TRACK

Tom George was promoted to senior vice-president of operations for McKesson Drug Co.'s 3PM pharmacy management hardware and software unit in Livonia, Mich.

George, 44, was most recently vice-president of systems development at McKesson Drug. He will have day-to-day responsibility for 3PM's operations.

He joined McKesson in 1965 and has held a variety of management positions. As a programmer and planning analyst in the 1960s, George was instrumental in the development of Economost, McKesson's pioneering pharmaceutical products order-processing network.

.....

Jim Gore was named to replace George as McKesson's vice-president of systems development, based at the firm's headquarters in San Francisco.

A 30-year McKesson veteran, Gore, 52, has been regional sales manager of the company's southeast region in Atlanta for the past four years.

In his new position, Gore is responsible for the maintenance of current drug company computer services and directing the development of new computer services. During his career with McKesson, he has held a number of field sales and sales management positions, including district sales manager for four of the company's distribution centers.

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Who's on the go?

Changing jobs? Promoting an assistant? Your peers want to know who is coming and going, and *Computerworld* wants to help by mentioning any IS job changes in Executive Track. When you have news about staff changes, be sure to drop a note and photo or have your public relations department write to Clinton Wilder, Senior Editor, Management, *Computerworld*, Box 9171, 375 Cochituate Road, Framingham, Mass. 01701-9171.

IS trailblazing puts retailer on top

Dedication to customer service drives Wal-Mart's emphasis on technology

BY ELLIS BOOKER
CW STAFF

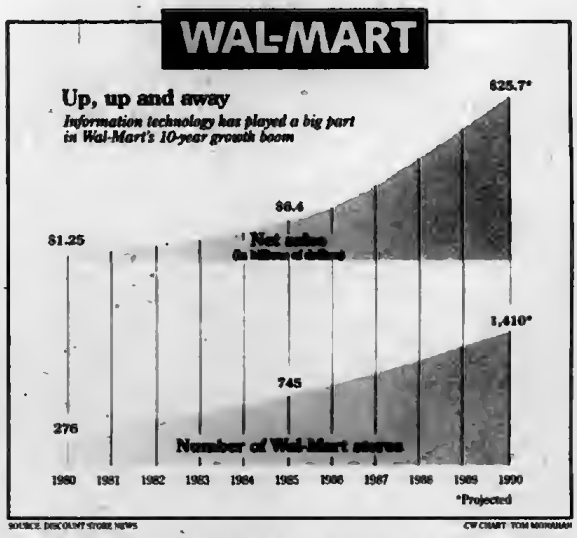
From a featureless red brick building in Bentonville, Ark., Wal-Mart Stores, Inc. quietly runs what many believe is the best retailing operation in the U.S.

That operation rests on an intense commitment to basic customer service coupled with a decade-old emphasis on information technology. The information arsenal ranges from the industry's first private satellite network to systems that monitor each store's daily sales and inventory and dispatch this data to the Wal-Mart's 17 distribution centers around the country.

"Our approach with technology is not trying to replace people but really supplementing what our people do and making them more effective," says Bob L. Martin, senior vice-president of information services. Martin runs the data processing function from a small, unadorned first-floor office in Bentonville, a town of about 10,000 in northwest Arkansas that typifies the setting of hundreds of Wal-Mart stores.

"Technology is a key part of our strategic thrust," Martin says. "Much that we've done with technology is a large part of our ability to compete." No doubt it is for precisely this reason that Wal-Mart IS executives are extremely cautious about divulging details, including the size of the IS staff or its budget.

Despite the low profile, Wal-Mart has competed extremely well. The retailer expects to report revenue for the year ended Jan. 31 between $25 billion and $26 billion and projects $32 billion for this year. This extraordinary growth has put it within shooting distance of K Mart Corp. and faltering market leader Sears, Roebuck and Co.



Martin says with conviction that IS at Wal-Mart is "a sheer support function" and that an awareness of customers at the store level is the guiding light. "Most of the good ideas [for IS applications] come from our hourly associates in the stores," Martin states.

Everyone at Wal-Mart is an "associate." After a brush with a union movement in the 1960s, the company, then with only 20 stores, did away with "management/employee" labels.

On the other hand, upper management is hardly uninvolved with IS strategy. Martin sits on an executive committee that meets weekly, bringing together all the company's head officers, from the chief executive officer on down. Wal-Mart's vice-chairman and chief operating officer, Don Soderquist, brings to this table a data processing and distribution systems background.

For his part, Martin joined Wal-Mart five years ago from Dillard Department Stores, another Arkansas-based retailer with a reputation for being technology-oriented.

The diamond in Wal-Mart's IS crown is a very small aperture terminal (VSAT) satellite network. The first

Continued on page 73

Making progress toward an elusive bond

BY CLINTON WILDER
CW STAFF

After years of effort, the critical but elusive partnership between information systems management and business executives is becoming more of a reality.

According to IS executives in both the U.S. and Europe recently surveyed by Index Group, Inc. in Cambridge, Mass., the "benefits of technology" sales pitch to senior management is less of a hard sell than it used to be. Sixty-five percent of U.S. executives and 70% of Europeans agreed with the statement, "It is getting easier for us to align IS and corporate goals," the report said.

Apparently, these executives have put their efforts where their concerns are, and it has paid off. In the three years that Index has conducted its survey, "aligning IS and corporate goals" has finished first, second and fourth on the list of issues of most importance to IS executives in the U.S.

In interviews of respondents, Index found several different reasons why alignment progress is being made. At the top of the list, however, were the time-honored practices of public relations and marketing.

"I've done significant selling over the past 12 months to top management," said an IS executive at a diversified manufacturing company.

At other firms, outside pressures have seemingly forced business managers to work with IS. "There's a gradual awakening of the penalty for catching up" to competitors who use technology strategically, said a forest products IS director.

Others said tighter budgets have demanded that technologists and businesspeople work together to choose priorities.

Organizational theorists may find it odd, but most executives said that IS/business alignment progress was occurring *without* a formal business process to promote it. In the U.S., only 18% of respondents said their companies had such a process, while 67% said they did not and 16% were neutral.

"Such a process requires the ability to predict the impact of future technologies on business processes — an ability missing in many organizations," said Index Chairman James Champy.

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BOOK REVIEW

Knocking Japanese management down a notch — humorously

Funny Business: An Outsider's Year in Japan
BY GARY KATZENSTEIN
Soho Press, $17.95

Before starting work on the first day of a year-long internship at Sony Corp. in Tokyo, Gary Katzenstein decided to take advantage of the company's subsidized cafeteria. He figured he'd stick with something familiar: a hard-boiled egg and glass of milk. But the milk was thick and gloppy, like English double cream, and he could barely swallow it. When he cracked the egg shell, he splattered his pants. The egg was raw — an accompaniment, it turned out, to the traditional Japanese breakfast of rice, seaweed and soy sauce.

Things never got much better for Katzenstein, who undertook the internship to learn about Japanese management after earning an MBA and a master's degree in computer science from UCLA. He recounts his humorous but humbling year in Japan in a slender volume, *Funny Business: An Outsider's Year in Japan.*

Katzenstein asserts that Japanese management isn't always what it's cracked up to be in best-sellers. He found Sony to be run by a "predestined elite" from the best universities who rarely listened to suggestions from the bowels of the organization. "The bottom-up nonsense was the stuff of American editors' dreams and theorists' rhapsodies: utter nonsense that we had perpetrated upon ourselves and perpetuated in our media-driven culture."

Katzenstein found Japan efficient, orderly and polite. He also found it rushed, cramped and impersonal. Taxi cab doors swung open automatically with the push of a dashboard button. A friend who left a handbag on a train recovered it a few hours later; railroad workers found it, still on her seat, and returned it by another train, complete with money, passport and camera.

At work, however, Katzenstein had to indicate his whereabouts when away from his desk by displaying one of 10 location cards. If he was gone for more than 30 minutes without doing so, his name would be called over a loudspeaker and the infraction noted on his record.

Like other workers, Katzenstein was assigned to a four-person lunch group. Most days he was expected to spend the 45-minute break in the cafeteria with the others, more or less in silence. He lived in a six- by 12-foot room in a company dormitory, sleeping on a roll-out futon.

Katzenstein takes a breezy, detached approach to his narrative — qualities that both strengthen and dilute it. Some readers will find the approach superficial. The book is descriptive rather than analytical or assertive. There is little digression from day-to-day experiences.

While these attributes may be shortcomings to some readers, they keep the narrative moving and help make the 220 pages painless to digest. Katzenstein puts the reader in his shoes, relating what he saw and experienced. His impartiality and the feeling of first-hand experience lend his observations a sense of authority.

Many of Katzenstein's observations are familiar, although freshly presented through his own experiences. Workaholism is rampant. Society is rigorously conformist: left-handedness is corrected in most of the children leaning toward it. There's no Japanese word for privacy.

His major lesson was how limited the opportunities are in Japan for a *gaijin*, or outsider. As a U.S. intern, he shared this status with ethnic Koreans whose families have lived in Japan for generations but who must register as aliens.

At Sony, Katzenstein was frustrated by a lack of meaningful work. Finally, he proposed his own project: a survey of corporate information systems. He had studied the subject in school, and Japan, he writes, lags behind the U.S. by two to five years in software development.

Like other temporarily promising opportunities, the idea went nowhere. A colleague who had worked in the U.S. explained why. The managers to whom the request was submitted were reluctant to try something they hadn't done for fear of failure. If the project were successful, they would feel deflated because a *gaijin*, had done something they couldn't do.

Ultimately, Katzenstein was fired for an unforgiveable transgression: He circumvented channels by trying to take his frustrations right to Chairman Akio Morita. He may have been destined for failure given his minimal acquaintance with the Japanese language. His experiences, however, present an eye-opening contrast to the conventional tomes on the wonders of Japanese management.

DAVID LUDLUM

Ludlum is a *Computerworld* senior writer.

Intel decides not to gamble with Mother Nature

BY JEAN S. BOZMAN
CW STAFF

FOLSOM, Calif. — An unacceptable risk. After careful analysis, Intel Corp. concluded that it was too much of a gamble for a $3.1 billion global corporation with 21,800 employees worldwide to have its computers and its network held hostage to the earthquakes of northern California.

"We made the decision to get out of the San Francisco Bay Area because of the high risk," said Bill Sale, operations manager for corporate information services at Intel.

Accordingly, Intel began installing computers at a site next to a Folsom manufacturing plant in 1986 — about 70 miles northeast of San Francisco — and finished the $6 million moving job last fall.

With the earthquake on its tail

In September, just weeks before the Oct. 17 killer quake, Intel moved all major mainframes and network links out of its Santa Clara, Calif., headquarters, which is 40 miles south of San Francisco. Fifty people in computer operations were relocated to Folsom in 1986, and a handful moved this time.

Now, the semiconductor maker's largest mainframes share a 40,000-sq-ft computer room here in this seismically stable area, not far from the state capital of Sacramento.

"We first became sensitive to the problem about 12 years ago, when studies we had commissioned showed that there was a near certainty that a great earthquake [over 8.0 on the Richter scale] would hit San Francisco by the turn of the century," explained Neal Franking, director of Intel's corporate information services.

"Originally, we had a design for two data centers, one in Folsom and one in Santa Clara," Franking said. "But when it got down to planning recovery, we asked ourselves if we could recover everything in both centers — and the answer was no."

Today, Intel's Santa Clara data center stands empty and silent — but it will remain as it is, a cold site for Folsom in the unlikely event of a disaster there. Intel figures it has two weeks to fully restore the cold site as a data center, since manufacturing and distribution applications could continue on the corporation's 10,000 IBM Personal Computers and on dozens of manufacturing-plant minicomputers.

Cindy Charles

Intel's Franking *became aware of the earthquake potential 12 years ago*

Intel now has all its mainframe eggs in one basket. There are four IBM mainframes, including two IBM 3090 Model 600s. However, even should disaster strike Folsom, Intel has contracted with a disaster-recovery services company to provide hot-site backup for this data center.

Intel is also shopping for a second hot-site service to supplement the first, according to Sale.

What Intel has in Folsom is a round-the-clock hub for its global network and a repository of corporate databases. The Folsom location offered more secure access to telephone company network hubs and to an overabundance of long-distance phone lines at the Pacific Bell central offices, installed to support California state government.

"We have a 24 [hour] by seven [day] program that we run in every geographical region's prime time," Sale said. "We provide the same [computer] services to Japan as we do to Phoenix, Ariz., or Portland, Ore."

To maintain communications with all global sites regardless of local disruptions, Intel's global network has plenty of redundancy, including fiber-optic links, microwave links and satellite links.

Valley exodus

In recent months, Intel also moved its last chip-fabrication plant out of the Silicon Valley, saying that San Francisco's high cost of living forced the move, not earthquakes.

Its corporate headquarters will remain in Santa Clara.

Intel executives believe they are ahead of the learning curve on disaster-recovery planning. However, other corporations in the region are actively planning as well, according to Ray Hipp, president of Comdisco Disaster Recovery Services in Rosemont, Ill.

"Boards of many large corporations are totally re-evaluating their disaster-recovery strategy," Hipp said.

"Before this, there was a kind of denial about earthquakes. People were wishing that the problem would go away. Now, they seem to feel they have to deal with it."

MANAGEMENT BRIEFS

Call for education computing papers

The sponsors of the **14th Western Educational Computing Conference** are currently seeking papers dealing with computers and computer applications. All papers should be of interest to instructors and administrative personnel who work with computers at the college level. Deadline for papers is April 21, 1990.

The conference will be held Nov. 15-16 in Irvine, Calif. Applicants should submit two copies of original papers to Dr. Oliver Seely Jr., CSU Domingues Hills, Chemistry, 1000 E. Victoria St., Carson, Calif. 90747.

ACM Siggraph is offering grants for computer graphics educators. The grants, which will support up to 25 educators in beginning, updating or strengthening computer graphics courses or programs, are open to anyone who teaches or supports computer graphics education in any discipline, including the arts, computer science, engineering and applications.

Grant recipients will also receive admission to Siggraph '90 in Dallas, Aug. 6-10. Entries must be postmarked by April 2, and awards will be announced by May 25. For application materials and information, contact G. Scott Owen, Mathematics & Computer Science Dept., Georgia State University, (404) 651-2247.

The Electronic Data Interchange Association is seeking speakers for its 22nd National EDI Systems Conference and Exhibit to be held Dec. 10-12 in Washington, D.C.

Any current EDI-related topic will be considered. Contact William Myers, assistant director of program development at The Electronic Data Interchange Association in Alexandria, Va. (703) 838-8042.

Wal-Mart

CONTINUED FROM PAGE 69

VSATs were installed in December 1986; by October of the next year, Wal-Mart had an operational network with 1,137 satellite terminals. The network provides real-time data, voice and video links to all the Wal-Mart stores in the country.

Currently, the VSAT network supports close to 1,600 nodes. Wal-Mart added 158 new stores last year and plans to open another 175 this year. Last month, it beat an in-house record by opening 36 stores in one day.

"It gives us tremendous capability," Martin says about the network. It allows users to share "not just ordering or sales information, but the constant dialogue and flow of information between the operations, merchandising and distribution functions of our company."

Each of the company's 17 distribution centers feature raised-floor computer environments; the 1,550 stores in the chain have IBM Series-1 computers, linked to the Bentonville home office via the satellite network, as well as intelligent handheld terminals and personal computers to run various in-store applications.

In general, outsiders believe Wal-Mart's market performance can be attributed to its success with "quick response," the retailing industry's equivalent to just-in-time manufacturing.

"They tend to be extremely secretive about what they're doing . . . you don't think of them as a leading-edge company," notes Ted Grossman, s professor of information systems at Babson College in Wellesley, Mass. "They are the sleeper in the industry. They come on by surprise and take their competition."

With the retail industry undergoing a major consolidation and with Japanese and European players entering the market, "[the industry] is becoming very predatory," says Grossman. "It's apparent from their level of secrecy how much value they place on the strategic importance of IS."

One future surprise for the competition may be expert systems, which Wal-Mart is rumored to be investigating intensively.

A more publicized feat is Wal-Mart's electronic data interchange (EDI) operation, which may be the largest in the U.S. The company claims that more than 1,800 of its 5,000 suppliers use EDI links. This process, be says, will inevitably lead companies to question their structure and traditional ways of doing business.

"Does that mean you'll rewrite everything from the past 15 to 20 years?" Martin asks. "Not necessarily." Still, be thinks greater application development productivity through such concepts as computer-aided software engineering (CASE) and reusable code "will be challenge No. 1" in the coming decade.

Cream of the crop

Analysts gush about Wal-Mart and its IS triumphs. Some believe the company is single-handedly reshaping how retailers do business; others say the recent drive toward technology-based solutions at K Mart [CW, Feb. 5] can be directly attributed to Wal-Mart's example — as well as its competition.

"Wal-Mart is s wonderful example of an organization that has combined the hard and the soft skills," says Robert M. Zimmerman, partner and retail industry chairman at Coopers & Lybrand in New York.

Zimmerman points to the legendary, "messianic" management style of Sam Walton, Wal-Mart's billionaire chief executive, who regularly visits individual stores in tiny hamlets to give inspirational talks.

"Meanwhile," Zimmerman continues, "the company is quietly pushing the implementation of technology. They're pushing these two elements simultaneously."

What about competitors such as Sears and K Mart? Both have "creative, intelligent people running their IS departments," according to Zimmerman, although neither have executed as well as Wal-Mart, he thinks. Wal-Mart stands out, Zimmerman contends, because it was the first to realize IS was "intregral to their success. They've been pursing this for the last 10 years."

For Martin, IS in retailing in the coming decade will mean more of the same.

"We'll eliminate processes that don't add value to the business or don't help our people serve the customer," be says. "If we can buy our people time to spend time with the customer or time to spend on the merchandise, that's value added."

Secrets revealed

While Wal-Mart executives are extremely reticent about providing too many details about their information systems operation, the following are a few facts that they will reveal.

- On-line storage capacity is growing at 100% annually.
- Over the last five years, the company has invested approximately $500 million in information technology.
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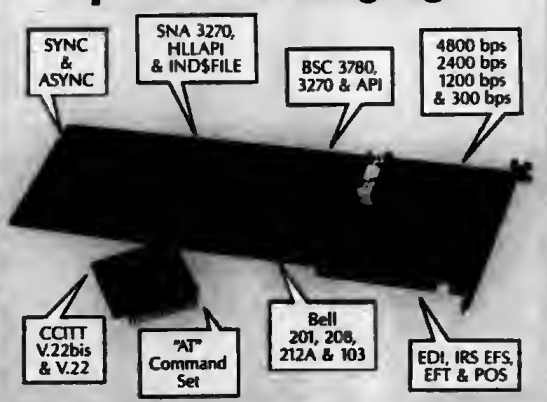

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Office PCs seeing increase in use

BY ALAN J. RYAN
CW STAFF

Computer usage in the office is on the rise — not so much in number of users but in the sheer time workers spend staring at their terminals and personal computers, according to the results of a recent study conducted by Louis Harris and Associates, Inc., in New York.

The study also showed that more and more workers are doing office work on their home PCs. PCs and terminals have become commonplace in businesses across the U.S., so it is no surprise that the number of office workers using them is not rising as rapidly as it had been in the late '80s.

However, the way workers use the equipment has become more serious and intense, according to the study, sponsored by office furniture manufacturer Steelcase, Inc. in Grand Rapids, Mich.

In the poll of nearly 1,500 office workers, top executives, facilities managers and contract interior designers in the U.S., the percentage of workers using PCs or terminals rose from 66% to 78% between 1986 and 1988.

Heavy usage

Today, 32% report they use a terminal or PC five or more hours per average workday — a sharp increase from the 25% reported in a similar study a year earlier. The median daily use of computers has increased to four hours per day vs. three hours per day in the previous study.

In analyzing the results, the pollsters said the computerization of the office involves an investment for companies — not only in hardware and software but also in consulting time and employee training, in developing standards and practices and in reconfiguring the work flow. However, the benefits will frequently mean a return on that investment through enhanced productivity, which in turn may translate to doing the same job with fewer people and in less time.

According to the most recent survey, more workers are using PCs at their homes, and more companies are supplying and maintaining the equipment.

Among the 1,041 office worker respondents, 28% said they have a PC at their home. Of those who did have a PC at home, 37% are technical workers, 31% classify themselves as professionals, 30% are managers and 17% are secretarial or clerical workers.

Workers who have PCs in their homes tended to work for large organizations, have attended college and earn more than $35,000 a year, the study said. Of those who have PCs at their homes, 28% (or 10% of the total office worker population surveyed) use their computers at home for office work and average about five hours of office work per week on them. Three out of 10 survey respondents who reported that they use their home computers for office work said the computer is provided and maintained by their employer.

In executive offices, the figures compiled by Louis Harris show that 57% of the 150 top executives questioned have a computer terminal or PC in their offices, compared with half of all top executives surveyed a year earlier.

The use of the computers continues to expand into all areas of the companies polled. For instance, 38% of the study participants said they most frequently used their computers to handle word processing tasks. One-third said they use their terminals for data entry, and 31% said the terminal is most routinely used to access an on-line database. Other common applications used are spreadsheets, electronic mail and personal calendars or project schedules, at 21%, 12% and 10%, respectively. Seven percent said their PCs are used primarily for graphics.

The biggest gripes for workers include eyestrain, with 44% saying this is a somewhat serious problem.

Next time you look at a CASE product, ask if it delivers more than promises.

UN

CALENDAR

Information systems managers face many challenges in the coming decade, including reconstructing the architecture of the workplace, building the information technology infrastructure of the future and building skills, incentives and interrelations among IS staff workers.

Nolan Norton & Co. will hold a March 1-2 conference in Tarpon Springs, Fla., to address those issues. The program, called "Breaking Away: Snapshots of the Future," will feature IS practitioners, academics and consultants who will discuss how they are meeting the challenges of the 1990s.

For more information, contact Lois Chase, registrar, at Nolan Norton in Lexington, Mass. 1-800-888-6246, ext. 330.

FEB 18-24

Computer-Aided Multimedia and Presentations Show. New York, Feb. 20-22 — Contact: Barbara Stockwell, Knowledge Industry Publications, White Plains, N.Y. (914) 328-9157.

Electronic Data Interchange Seminar. New Orleans, Feb. 20-21 — Contact: Kari Pike, Washington, D.C. (202) 887-1375.

Electronic Imaging '90. Washington, D.C., Feb. 20-22 — Contact: U.S. Professional Development Institute, Silver Spring, Md. (301) 445-4400.

Information Security Managers Symposium. San Diego, Feb. 20-22 — Contact: MIS Training Institute, Framingham, Mass. (508) 879-7999.

Software Quality and Productivity Workshop. Boston, Feb. 21 — Contact: Debbie Chapman, Software Productivity Research, Boston, Mass. (617) 495-0130.

Executive Information Systems Briefing. New York, Feb. 21-22 — Contact: Infoline, New York, N.Y. (212) 557-3400.

Investing the Future of Computing and Communications. Cambridge, Mass., Feb. 21-22 — Contact: Patricia Seybold's Office Computing Group, Boston, Mass. (617) 742-5200.

The Role of Technology in Education. St. Charles, Ill., Feb. 21-23 — Contact: North Cook Educational Service Center, Glenview, Ill. (312) 998-5065.

Networking: Matching Systems with Your Operations. New York, Feb. 22 — Contact: Maureen Christensen, Association of the Graphic Arts, New York, N.Y. (212) 279-2100.

International Conference on the Management of Technology. Miami, Feb. 22-March 2 — Contact: University of Miami Conference Center, Miami, Fla. (800) 633-8647.

FEB 25-MARCH 3

Senior Management Symposium. Phoenix, Feb. 25-28 — Contact: Information Industry Association, Washington, D.C. (202) 639-8262.

Trax User Group Conference. Long Beach, Calif., Feb. 25-28 — Contact: Trax Softworks, Los Angeles, Calif. (213) 475-8729.

Strategic Management Technology Workshop. San Francisco, Feb. 26 — Contact: Diane Sotos, Battelle, Columbus, Ohio (614) 424-6499.

Computer Graphics '90 Conference. St. Petersburg, Fla., Feb. 26-28 — Contact: Frost & Sullivan, Inc., New York, N.Y. (212) 233-1080.

Compcon Spring '90: IEEE Computer Society International Conference. San Francisco, Feb. 26-March 1 — Kenichi Miura, Fujitsu America, San Jose, Calif. (408) 432-1300.

National Design Engineering Show & Conference. Chicago, Feb. 26-March 1 — Contact: National Design Engineering Show, Stamford, Conn. (203) 964-0000.

IBM SAA Enterprise Internetworking SNA/LU6.2 Distributed Networks, APPC and SAA/CPI Architectures and Implementations Seminar. San Francisco, Feb. 26-March 2 — Contact: Galaxy Consultants, Los Gatos, Calif. (408) 354-2997.

Electronic Imaging Exposition & Conference. Pasadena, Calif., Feb. 27-March 1 — Contact: MG Expositions Group, Boston, Mass. (617) 232-3976.

Sun Expo. Washington, D.C., Feb. 26-28 — Contact: Texas Computer Association, Clayton Peters, Executive Director, Sun Expo D.C., Austin, Texas (512) 331-5055.

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Computer & Electronic Publishing Show. Chicago, Feb. 27-March 1 — Contact: CEPS '90, Stamford, Conn. (203) 964-0000.

Outsourcing: The Kodak Effect. New York, Feb. 28-March 1 — Contact: The Yankee Group, Boston, Mass. (617) 367-1000.

Marketing the Information Systems Organization Internally. Washington, D.C., March 1-2 — Contact: Ouellette & Associates, Inc., Bedford, N.H. (603) 623-7373.

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TAKING CHARGE

M. Arthur Gillis

Resolutions for the new decade

For the time-pressed reader (I guess that means just about everyone), here is a list of 25 New Decade Resolutions for information systems management. You can read one or read them all — and try out those you agree with.

1. Some systems solutions that were considered conventionally prudent during the 1970s and 1980s will probably be wrong in the '90s. Rethink old methods.

2. Understand what obsolescence really means as it relates to information technology. Vendors like to use the word to force buying decisions.

3. Understand the real differences between building an in-house IS shop and relying on third parties. Each is good in its proper place.

4. Rethink how to prepare properly for major systems procurements. Homework is 80% of the job. Contacting vendors is the last task.

5. Computers aren't mints — they don't make money. Competent employees make money, and they should use automation wisely to help them do their job better.

6. Software is the key to success. Give me tomorrow's software and yesterday's hardware, and I'll still beat the competition.

7. Selecting a new system should be a 10-year decision at minimum — hopefully a 15-year decision.

8. The right solution is the one that fits the best for your company. What other companies do is good for bedtime reading only.

9. Pro forma budgets are simple to do with Lotus 1-2-3. But what you put into the cells comes from at least 20 years of experience gained in the trenches, maturity gained from foolishly thinking that the paper plan and the checkbook will reconcile perfectly.

10. Getting quick turnaround from your vendor or in-house department should be a major consideration in selecting the source of your IS capabilities. Do your employees respond well to pressure? Do vendors respond well to cancellation threats?

11. Control doesn't mean you have to own the resources, but it helps.

12. How will your system handle dramatic growth if it should occur? Learn to expand in increments. Stop swapping.

13. How will your system adapt to new business trends and services? Design the gates to be a little wishy-washy — don't be too absolute.

14. Who will do a better job — your employees or a contractor's employees? A hybrid approach can be very effective.

15. The final 20% of automation may just blow the budget. Know when to stop.

16. Know what computers do well and what people do well. There's a proper place for both. It will never be one or the other, and we have the impotence of artificial intelligence to prove it.

17. Buying more hardware in line with customer growth is a sign of success. Buying more hardware to feed the system is bad.

18. If a company is careful enough to have an audit committee, it should also have a systems review committee.

19. One brand name on everything is usually good only for the company whose name is on the label.

20. "Keeping up with technology" is the best signal to top management that the CIO is going to pull a fast one.

21. Cost justification is not always possible — sometimes a computer solution is just the right thing to do. There are times (maybe once a year) when it is right for management to be a little soft when IS proposes a new project.

22. If the CIO can't run the company, why is it that the chief executive officer thinks he can run IS? Choose the best CIO for the job and let him go. General management will never understand IS well enough to second-guess a good CIO.

23. The best CIO is a businessman first, a company person second, a leader third, an accountant fourth, a diplomat fifth — and a technocrat last.

24. Hiring the best CIO in the industry is not enough to guarantee success. Success will depend on about five other managers below him. It may even be better to have five strong managers and a not-so-hot CIO.

25. The perfect system is like the perfect product, the perfect investment, the perfect management team, the perfect customer or the perfect employee — all very noble pursuits that we strive to achieve someday.

COMPUTERS aren't mints — they don't make money. Competent employees make money, and they should use automation wisely to help them do their job better.

Gillis is president of Computer Based Solutions, Inc., located in New Orleans. He consults on management issues related to the banking and healthcare industries.

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The buddy system takes more than handshakes and smiles

BY DAVID LUDLUM

There's a lot more to partnership than slipping a report under a business manager's door, says George Diehl, business manager for helium at Air Products and Chemicals, Inc. in Allentown, Pa. If IS executives are really going to function as full partners of business managers, there has to be face-to-face contact and shoulder-to-shoulder effort. That's the kind of relationship Diehl has developed with IS director Paul Prutzman and his staff since the company decided that selling liquid helium to a new class of customers — makers of the magnetic resonance imaging machines used in hospitals — required a joint effort from the sales force and IS.

Including IS executives in sales calls was just one aspect of the partnerships the company fostered among line managers and systems professionals as it pursued the new market. Members of the two groups also held weekly breakfast meetings and developed presentations together.

Through the alliance, the industrial gas division was also able to take advantage of electronic data interchange services that Diehl says helped it win the bulk of a market that did not exist five years ago.

Andy Freeberg

Prutzman (left) and Diehl *teamed up in the field to pursue and capture a new market*

More than a backslap

Partnerships can do more than help generate ideas for systems. They can smooth the approval of initiatives and simplify decision-making once projects are under way. There'a more to forging them than handshaking and backslapping, however. They require business planning, monitoring key executives and knowing when and with whom to partner. Once projects are approved, it is essential to communicate, bring in the appropriate staff members and monitor costs and schedules carefully.

At Mutual Benefit Life Insurance Co., George Phillips, vice-president of group information services, relies on a business partner to champion systems initiatives. He says he feels confident about management approval of funding for imaging technology because the idea has the support of Bob Zambri, the manager in charge of large case administration.

Phillips says that if he were pushing for imaging on his own, it might appear that the IS organization were promoting technology merely for the sake of technology.

At Fleet/Norstar Financial Group in Providence, R.I., Chief Information Officer Michael Zucchini works in tandem with Charlie Carry, another executive vice-president, who is responsible for commercial lending at the company'a eight banking subsidiaries.

In a project to install a commercial loan package, the two find that by working with one subordinate each, they can resolve issues among themselves that might have gone to a committee representing all eight banks. "The four of us try to cut through the gobbledygook and bureaucracy of committees," Carry says. Not having a partnership, he says, would he going into s project with only half of one's resources.

Despite the potential payoffs, partnership isn't the ideal model for every IS-business interaction, and IS executives need to think about that before buttonholing business managers. Sometimes partnering is appropriate and sometimes it isn't, says John Henderson, an associate professor at MIT's Sloan School of Management, who has spent the last 18 months researching partnerships involving IS executives.

In some cases, it is better to think of the relationship as one between customer and value-added supplier, according to Henderson.

"You can't afford [the time] to he s partner with everyone," he says. But that is all right, he adds, because at any given time, only a few user groups will he strategic concerns for the IS organization.

The challenge is to know which users are critical by understanding the company's strategy. Otherwise, IS managers will misallocate resources and raise expectations that can't he met.

"Using that word 'partner' loosely can get you into a lot of trouble," Henderson says.

Keep your distance

Tom Pettibone, senior vice-president of information services at New York Life Insurance Co., likens his relationships with the company's business managers to dealings between a vendor and its customers rather than to alliances between partners. The reason is that he has responsibilities to the corporation to control costs that may not harmonize with the interests of business managers.

In addition, Pettibone says, in a partnership he would feel free to champion information technology initiatives himself. It is up to a line manager to do so, Pettibone adds, because he is the one who must generate the benefits.

"He's got to get behind the

Ludlum is a *Computerworld* senior writer.

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Buddy system

FROM PREVIOUS PAGE

thing," Pettibone says. "I can't be the banner carrier. Projects almost never succeed if I am the champion and the customer has other priorities."

There are other issues to weigh before trying to launch a partnership. Some of them concern the corporate environment. Bill Friel, vice-president of information systems at Prudential In-

Prudential Insurance's Friel

surance Co. in Roseland, N.J., says that the notion of partnership sounds nice — "kind of warm and fuzzy" — but that it won't go anywhere if the necessary groundwork has not been laid.

"The first thing you're looking to do is align the business directions with the technology directions," Friel says.

At Whirlpool Corp. in Benton Harbor, Mich., Richard Koeller, vice-president of information technology, says he believes partnerships may not generate spontaneously and should get a push from top management.

Koeller and William Marohn, executive vice-president of Whirlpool's North American Appliance Group, are launching an effort to form partnerships between IS and business managers throughout the group. The initiative, aimed at helping business managers use information technology more effectively and in new ways, is an outgrowth of their participation in the Centrum program of the consulting firm Index Group, Inc.

Once the foundation has been laid, it is up to the IS executive to take the initiative in launching partnerships. "It's not fair to expect the business person to know about the need for it," Koeller says. If nothing else, he adds, there's always the direct approach: "Here's what I mean by a partnership — "here's my role; here's your role. Do you agree? Do you disagree? How can we work this out?"

Fleet/Norstar's Zucchini says IS executives should demand a partnership. They have been too meek about doing so in the past. If business managers do not agree to something like a partnership, IS executives should refuse to deliver systems because of the poor chances of success, according to Zucchini.

When an IS executive is ready to seek out an appropriate partner, there are places to look and characteristics to seek. Finding the areas to target is easier than finding the people. Naturally, it is helpful to concentrate on key areas of the business or ones in which information systems are likely to produce the greatest benefit.

Robert Ridout, manager of computer systems and telecommunications at Du Pont Co.'s Polymer Products Department, tries to get plugged into what he calls the "inner circle."

"You're going to have a group of five to 10 people that really run a particular activity," Ridout says. At Du Pont, the inner circle usually centers on the marketing organizations within departments, and that is where Ridout is likely to concentrate his efforts.

After identifying the area in which a partnership might be developed, IS executives need to target an individual. Personal rapport is a good starting point. The longer someone has worked in a department or company, the easier it should be to find a partner. After Ridout's recent transfer from another department, he found it relatively easy to work with the vice-president in charge, Jeff Lipton, because they had worked together before. Even if you have a connection, a business partner should be well placed to be effective. Sometimes there are decision-makers behind the scenes; it's important to know who they are. Other things being equal, aim high. At times, it is necessary to move down a level, but the higher a person can establish the partnership, the better off he will be, in part because he will be working with more reliable information.

Atochem's Rubin

"Many projects don't go as well as they should due to inaccurate information," Zucchini says.

It is also important to find a partner whose motives can be trusted — one who is interested in what's good for the company rather than self-aggrandizement.

Robert Rubin, vice-president of IS at Atochem, NA in Philadelphia, says that factor was important when he installed a new payroll system with the company's senior vice-president of personnel. The two decided it would be best to merge the payroll and personnel benefits organizations into a new administrative processing unit, cutting down on overhead. One thing to keep in mind when undertaking such changes, Rubin says, is for both partners to approach things with an attitude of getting the changes done rather than getting credit for them.

> "YOU CANNOT be a solution in search of a problem. Forming the partnership around some intellectually interesting thing that doesn't affect his job will not work."
>
> RICHARD KOELLER
> WHIRLPOOL

New York Life's Pettibone

Knowing as much as possible about a prospective partner's business can provide a leg up on trying to start a relationship. In that regard, IS managers say they are adding business publications such as *The Wall Street Journal* to their primary reading material. They are also venturing out into the field to examine manufacturing processes or other operations and learn more about products.

Ridout took a Du Pont training program intended for marketing managers. He and other IS managers are hiring people from user organizations to bring expertise into their departments. Other managers say they are strengthening partnerships when they assign staff members to serve as liaisons for user organizations.

At The Hartford Insurance Group, Jack Crawford, vice-president of information management, keeps abreast of how well he is serving his business partners through quarterly "report cards" that the business managers send him. "There's no better way to find out how my department is doing," he says. The report card grades are a factor in the performance reviews of subordinates who manage systems for the business units.

The real means of coming to grips with a business manager's concerns, and the real essence of partnership, is the one-on-one exchange. It ranges from the casual encounter to damage-control sessions in a crisis situation.

Partnerships are not just for key projects. One is likely to sustain only a few close working relationships at a time. However, it is necessary to maintain more informal dealings with a wide circle of business managers. At some point, these people may turn into full-scale partners, and the previous acquaintance will be helpful. In the meantime, the information they provide is valuable. At New York Life, Pettibone finds there's a group of 30 to 35 department heads and similar executives with whom he needs to keep in touch.

Logistics can make a big difference in this kind of effort. At Fleet/Norstar, Zucchini and most of the other executive vice-presidents who serve as his partners work on the same floor, so he can speak with them nearly every day. He says he picks up important information from casual exchanges: Once, for example, a passing remark about operational weaknesses at a banking unit prompted him to beef up a conversion team.

These chance encounters are just the first step in keeping abreast. One can always check in with partners by picking up the phone or going out to lunch. "I'm having lunch with one of them today to review issues and opportunities and go over golf scores," Pettibone says. "And I do that almost every day."

Mutual Benefit's Phillips is primarily a tennis player but dusted off his golf clubs to spend more time with Zambri. "We have a more friendly relationship as well as a business relationship," Phillips says. Adjoining offices helped them build that acquaintance when they started working together. "I could stop in and talk about anything." They don't work next to each other now, but the feeling of closeness continues.

Pushing the right buttons

The key to building partnerships is finding out what your partner needs. The partnership must add something meaningful to his work.

"You cannot be a solution in search of a problem," Koeller says. "Forming the partnership around some intellectually interesting thing that doesn't affect his job will not work."

Just because someone built a great manufacturing control system in your last job doesn't mean a prospective partner needs one now, Koeller adds.

Good partners work hard at communicating these needs. Many IS executives devote a large portion of their time to discussing specific initiatives with business partners.

In his new post at Du Pont, Ridout is concentrating on upgrading internal IS operations and spends about 25% of his time with business managers. In his previous position, it was more like 50%, a proportion he would like to get back to when he has addressed internal issues.

Finding common interests and making time on the calendar isn't all it takes to keep up with a potential partner's business priorities. Both sides also need to work at establishing a common working vocabulary.

Partnerships can flounder if the participants do not reach out and try to communicate in plain English and "on a human level," Fleet/Norstar's Carry says.

His partner is more explicit about the process: "You need to know how to ask the right questions and know that you got the right answers," Zucchini says. You have to ask a lot of questions as you work toward an understanding, he says. Then you have

Fleet/Norstar Financial's Zucchini

to reiterate all the questions and answers to confirm that your understanding is correct.

The communication isn't all one-way. "The more the user understands what you're trying to accomplish, the more he can supply you with information you need," Zucchini says. "That's what you get out of a partnership that you don't get out of an interview. They begin to think about what you want to accomplish, and they get active in that."

If showing a partner how a project can succeed is important, so is acknowledging past failures, MIT's Henderson says. Learning from failures can lead to new opportunities. "One element of building a partnership is honesty," he says. "You win some, and you lose some. You should be as willing to admit when you didn't perform well as to take credit for the times you did."

Just as alignment of business strategies and technology directions must underlie the personal rapport of partnerships, pursuit of specific initiatives requires organizational cohesion. That

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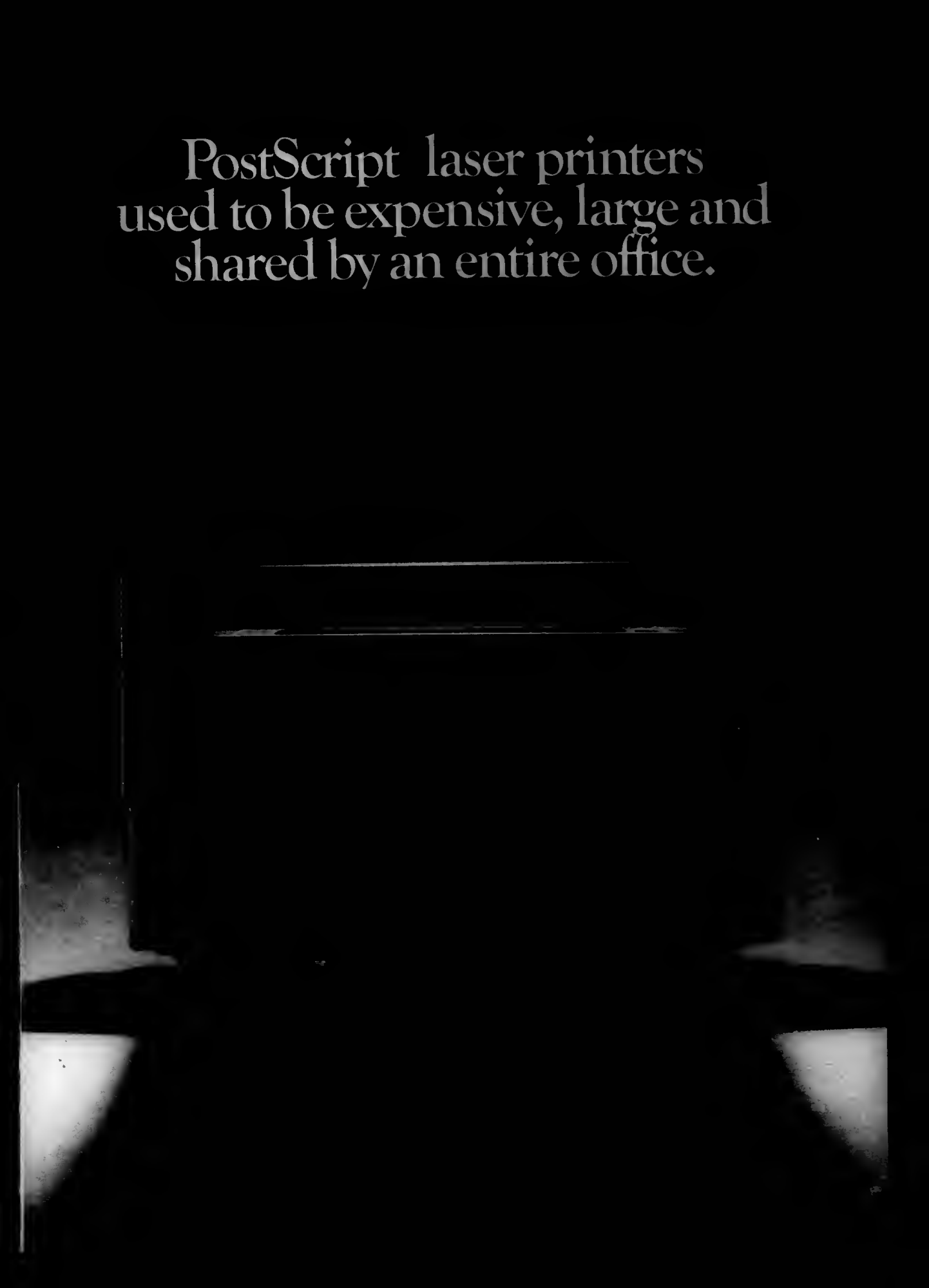

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TEXAS INSTRUMENTS

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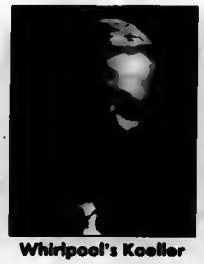
means the staffs must become partners as well. At Du Pont, once Ridout gets plugged into the inner circle, he gets his subordinates plugged in, too; he asks his partner to include them in planning sessions.

Involving the IS staff requires its own groundwork. Members must be equipped with the proper business knowledge and interpersonal skills to make a contribution. "You need to measure systems success in terms of business success, and that's a hard sell to some systems people," Ridout says. "That means that if a project is a technical success and business failure it is a failure" overall.



Whirlpool's Koeller

One key to staff involvement is for the senior IS executive to set an example. "Once they see the unity that I have with Charlie on this, it gets contagious," Zucchini says.

But he and Carry don't just rely on the power of example. When stalemates occur, Carry says, "What Mike and I do is get everybody in the same room and say, 'OK, what's the problem?' You have to constantly reinforce this partnership."

Once under way, conventional wisdom dictates that it is the business manager who leads the partnership. This is largely true, but there are some important qualifications to the rule. It doesn't follow that the IS executive is a silent or passive partner. "I speak my mind," Ridout says. "You can't be shy."

Du Pont's Ridout

The key to sustaining partnerships, in Henderson's view, is monitoring and controlling the relationships. Partnerships must be in a mode of continual improvement, or they can start on a downward spiral, he says.

There are some aids for keeping a partnership on track. It is important to employ sound project management to ensure that initiatives are on schedule. Realistic accounting of the costs of developing and using systems also can help. So can service agreements, as long the standards they establish reflect business goals rather than concerns such as computer uptime.

In the end, to make partnerships work, both the business and the systems side must be willing to give even more than they get. A 50% contribution isn't enough, Rubin says. Each party should be prepared to kick in 70% of the effort. ■

Once bitten, twice shy

All right. You've targeted a high-payoff application. You've identified the decision-maker in the user organization with the clout to serve as your partner in developing it. That's the easy part. The problem is that your prospective partner got burned by information systems people in the past. He doesn't want to sit down to negotiate. What do you do?

There are a number of ways to soften up reluctant business managers.

One is to bring in an intermediary, perhaps another business manager whom the prospective partner trusts.

Another technique is to foster good word-of-mouth by delivering results to another, more cooperative business manager first.

Finally, there's the tack of concentrating on day-to-day activities or taking on a smaller project in order to build up confidence.

"You can always find something business managers are interested in. I don't know anyone who's not interested in reducing costs," says Robert Ridout, manager of computer systems and telecommunications at Du Pont Co.'s Polymer Products Department. Once interest is piqued, quick results can cement a relationship. George Phillips, vice-president of group information services at Mutual Benefit Life Insurance Co., says he tries to identify projects with a fast payoff when building credibility.

Phillips once directed the development of a sales support system for a sales manager who was not particularly amenable to partnerships. Phillips developed the system quickly by bringing in an outside contractor. In addition to speedy completion of the project, his willingness to go outside showed the sales manager he was more interested in getting the project done than winning work for the IS group. That's what business managers want to see, "business interest, rather than just an interest in IS," Phillips says.

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EXECUTIVE REPORT

Muddled signals can undermine even the best of team structures

BY WILLIAM N. HARRIS
and SUSAN K. BEHNKE

It is a truism that no business can thrive without good customer relations, and that rule also applies to the IS department. More often than not, when a chief information officer gets in trouble, it is because of problems in partnerships with users.

A company tries to establish a good working union between a vendor and a customer because successful businesses are built on repeat or continuous patronage. The IS department should want the same working union.

The internal information systems users of a corporation are often hostage "customers" of the IS department, but they cannot be taken for granted; nor can any aspect of a philosophy, opinion or policy be taken for granted at any point on the organization chart. The corporate front office does not take such matters lightly; why should the CIO, who is more vulnerable than the chief executive officer to criticisms resulting from misunderstanding? The CIO cannot demand that his or her wishes be honored. Instead, he must seek cooperation through a shared vision of what needs to be accomplished by IS and users.

Philosophy, opinion, policy, shared vision — these are all matters of communication. Most of an IS department's more serious mistakes have to do with failures of communication. Passing along pertinent information to users is critical. So is making sure that everyone in the IS department marches to the same drummer and that the beat is loud, clear and pleasing to users.

Achieving effective communication requires more than simply establishing partnerships between IS and users. These partnerships must always be at the forefront of the CIO's thoughts, no matter how difficult or distracting IS technical problems become — in fact, especially when technical problems become taxing.

Primary aspects of partnership-building include the following:

1) Establishing a corps of account representatives.
2) Establishing and communicating a clear vision of how IS and business units should work together toward company goals.
3) Building consensus for the established partnership model.
4) Making provisions for possible emergencies, so partners are never left in the lurch.

First, IS departments should include people whose function, training and skills are in the actual business and politics of dealing with user groups and who act as account representatives. These people must be oriented toward sales and marketing because that is the essence of their jobs. They work toward fully understanding what users need and why they need it. They then interpret these needs to the rest of the IS organization, thus assisting the users in acquiring IS support.

MOST OF an IS department's more serious mistakes have to do with failures of communication. Passing along pertinent information to users is critical. So is making sure that everyone in the IS department marches to the same drummer.

Although the job of seeking details on individual user needs can be assigned to individuals, it is also necessary that everyone involved on both sides have a consistent understanding of what the company is trying to accomplish. That includes understanding the procedures to be used in pursuing those goals.

For example, senior management of a

Continued on page 84

Harris and Behnke are chairman and president of Behnke Harris & Associates, Inc., a management consultancy in New York and Atlanta.

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Signals

FROM PAGE 83

company, including the CIO, may agree upon a policy that requires all IS activities to be cost-justified against a designated amount of money, with funding to be allocated on the basis of established company priorities.

But, unless that policy and the procedures supporting it are communicated effectively throughout the organization, the intent of the agreement is likely to be thwarted.

If full information is not disseminated through all departments and at all levels, users are likely to be asking their IS representatives for all sorts of things that would never win approval.

Stumbling blocks

Such a situation clearly compromises the work of account representatives, who are trying to build relationships with users. If users don't understand that there is a cost-justification policy in place and that their own bosses had a hand in formulating it, refusals of projects by IS will naturally seem arbitrary and unreasonable.

If, on the other hand, IS personnel are fuzzy about the rules governing project approval or uncertain how strict they should be in adhering to those procedures, mass confusion can result.

That's what happened at one major consumer goods company with a formal but badly publicized approval process. Senior management, including the IS chief, agreed that all requests for IS service should be justified and prioritized and that parameters — a tightly guarded budget —

had to be established. The company set up a steering committee to deal with requests. But there was a fly in the ointment.

The fly was what amounted to a separate communication system at the middle-management level. Middle management in marketing had a very close and long-standing relationship with middle management in the IS department. A marketing manager would say to his IS counterpart, "Gee, I know we're not supposed to do anything not approved, but I really need this tweak." The IS manager then would try to accommodate his pal in marketing.

Middle-management anarchy resulted. Middle management of IS and marketing were out of sync with both IS and corporate upper-level management. There was one drummer at the senior level and another down in the ranks.

In retrospect, the company's CIO realized that the user steering committee participants had not made it clear to their management teams that getting everything cleared through the steering committee was not only company policy but really necessary. One of the ways in which IS can strengthen each user partnership is to help educate senior user management on the necessity of information systems support to the user group. Thus educated, the senior managers can be strong advocates for requests during the budget-writing process.

It is equally important that all levels of IS have a complete understanding of the organizational hierarchy through which a partnership is to be accomplished and the rationale for it. For example, divisions or subsidiaries often have their own IS staffs who enjoy a tradition of autonomy. If new corporate policy calls for a centralized IS organization in which software, hardware and architecture policies are decided at the top, previously autonomous IS departments may balk. They may not wish to adhere to corporate standards. The IS director may find that he must educate these IS units on why his position should enjoy a mandate for control.

> IF INFORMATION SYSTEMS personnel are fuzzy about the rules governing project approval, mass confusion can result.

Again, compromise may occasionally be desirable when it will not interfere with what the IS manager is trying to accomplish, since the rebellious IS groups then are able to do a few things their own way.

Even assuming that all parties understand the policies, principles and budgeting procedures that govern IS-business relations, it is still a good idea to build some reserve capabilities into the IS plan. During a fiscal year, users often will experience changes in priorities or will face emergency needs.

If the IS group cannot meet some of these new or emergency requirements because all resources are committed to projects given priority at the start of the year, the company will have some very unhappy users. And discontented users do not make either good partners or loyal customers. The IS chief, therefore, must be an effective advocate for reserve capabilities.

Keeping all of these points in mind will help to keep working relationships between IS and business units on solid footing. The partnership model that the CIO has to sell both to his own staff and to all user groups is one in which each side is aware at all times of the needs and limitations of the other. •

Can a player coach the team, too?

BY LEILA DAVIS

Information systems managers need both sponsors and partners. These relationships are informal at most companies, and as a result, many characteristics overlap between partner and sponsor. Sometimes, a single person can fill both roles, but usually not, since their tasks differ.

Although a sponsor and a business partner can be one and the same or share many characteristics, the roles should ideally be separate, according to Thornton May, a director at Nolan Norton & Co., a management consulting organization based in Lexington, Mass. Recognizing important attributes is the trick to picking the right person for the right job.

"The business partner has to be able to work through logjams. If he runs into an impasse, he must know how to find out what the work-arounds are," says Phillip McKenzie, director of special projects at Sara Lee Hosiery in Winston-Salem, N.C., a subsidiary of Sara Lee Corp. in Chicago.

In his post, McKenzie formally oversees projects between IS and the business units. A partner, he adds, "must know how to bring people to consensus to keep the project moving. If the problems aren't resolved, the momentum will disappear."

Business partners must have both the time and the skills to become the liaison between the project's future users and the IS staff. Project sponsors, however, are usually more political facilitators who operate at a higher level within the organization.

"Typically, the business partner is involved because he is helping to create a working environment within his department, whereas a sponsor is usually politically motivated," May says.

A sponsor's role often involves maneuvering information systems projects through senior management approval, so the CIO should know how much influence his prospective ally wields.

A partner with pull

"You need to partner with someone who has the influence not only to make the decision for change but who can make it happen," says Priscilla Emery, manager of research and development for information systems at Blue Cross/Blue Shield of Connecticut.

At Blue Cross, sponsors possess the qualities of both a project champion and a business partner. Typically, they are the highest level person in the company area in which the project is being implemented, holding broad project responsibility but remaining removed from day-to-day involvement. All projects require sponsors, and they come together in different ways.

"Some relationships are more formal than others," according to Emery. "Some are based on task forces put together to study a certain project. Other people just hit me in the hallway with a question that develops into a major business partnership."

The most crucial attribute in a line manager partnership, Mays says, is the ability to "deal with . . . a project in which the end state can't be specified."

Most executives are more comfortable with specifics, May points out, but "if you specify to that level of detail in [a technology] project, you are shutting down the creative resources you should be using to solve the problems. You need to partner with someone who is comfortable not knowing the answers at the beginning."

Dealing in generalities

A project sponsor does not deal in specifics, either, according to May, but works in even greater generalities "because he is creating the image that sells the project.

"The objectivity is lost if the sponsor and business partner are the same person," May adds. "The credibility, the political ability to rock and roll in the organization is lost if the sponsor is close to the project."

May also notes that the sponsor — a corporate networker — cannot fulfill that role successfully if his time is spent closely monitoring the progress of the project. "You aren't going to have the time to go massaging the nodes on your personal network if you are also acting as the business partner," he adds. "Also, saying, 'This is great, and I'm managing it,' is beating your own drum, which is always a little suspect."

McKenzie at Sara Lee Hosiery agrees. "A sponsor must appear unbiased, whereas the business partner must be involved. But both parties must . . . control the natural conflicts that come up from both sides in an impartial way."

Both sponsor and business partner should share another important characteristic: a business perspective. "Their ability to succeed," according to May, "is directly related to their business acumen.

"Altruism doesn't exist in the corporate environment," he adds. "These people are involved because they expect a return." For the business partner, the return can directly improve his department's operations.

A thorough understanding of technology is not required, but both sponsor and business partner must be open to technology and able to understand its implications. May does not recommend partnerships with the power PC user. "They are too directly into the technology," he says.

"The CIO needs someone who is interested in the totality of the enterprise," May adds. He suggests watching for the business manager who stays awake during joint departmental meetings: "He's the one interested in the whole picture."

The roles of IS executive, sponsor and business partner are dependent on one another's success, May says.

"The sponsor's role is to make all who are associated with him successful. The sponsor and the CIO can only be successful if the business partner is successful," May notes. •

Davis is a free-lance writer based in Alexandria, Va.

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INTERVIEW

A natural affinity

Victor Deutsch is a strong advocate of building partnerships between IS and finance. As vice-president of finance at Fishking Processors, Inc. in Los Angeles, he works as a peer with the IS director. And, as chairman of the Financial Executives Institute's Committee of Information Management, he actively promotes the idea of such alliances. Deutsch recently spoke with freelance writer Janet Fiderio about the nature of the IS-finance connections.

Do you think IS and finance are natural partners?

Yes. Information is a key component, so IS and finance is a critical partnership. Financial executives are responsible for the quality of corporate assets and for the protection of those assets. Therefore, it is natural for the financial executive — who is one of the prime users of information — to have a vested interest in the quality and nature of information that is developed.

How important is the IS-finance relationship?

Information systems are becoming more and more critical in the management of companies. Once upon a time, an entrepreneur could walk through his plant and see what was happening or could take a look at the order book and know what the sales were. Today, in larger companies, the entrepreneur is the CEO. He often can't just walk through the plant or plants because they may be in 20 different countries. Therefore, there has to be a flow of information that gives him that same grasp of the situation.

How do most companies define the relationship between finance and IS?

There's been a lot of superior/subordinate relationships, but I think we're seeing them change. In many cases, the CFO is considered at the very highest ranks of management under the CEO. And the CIO, or whatever title the IS person has, is farther down the scale. You can't, however, go just by a table of organizations [organizational chart]. The relationships, not the tables, are what really count.

Will it become common for IS professionals to attend planning, production, finance and other meetings that traditionally were out of their expertise?

Yes, I think you'll see that trend. When the responsibility and also the technology is pushed down into the operating unit, that automatically creates a new relationship between IS and others at every level within an organization. The CIO is going to work at the very top level of management to determine what direc-

tion the firm wants to go in and then set those specifications. That brings the CIO into the very senior level of management.

How can the IS manager be accepted as a peer by the senior executive suite?

The CIO has to understand the strategic thrust of the business, and be has to understand how they wish to accomplish it. Then be's got to be able to make decisions as to what type of technology is required. That doesn't mean that he has to sit down and personally write the code, but be has to be able to give directions to accomplish the goals and meet the needs of top management.

How can the CIO ease into a working relationship with an executive who is reluctant to work as a peer?

In that case, the CIO has to learn a little accounting. One thing that never hurts is an MBA . . . The most important thing is to understand business management. If you're a technician and all you do is spend your time as a technician, then unless you're very unusual, you'll have a problem making the jump. Unless you can talk the language of the financial executive, it's going to be pretty hard.

What kind of joint projects are IS and finance well suited to?

There's not one specific area. Right now at Fishking, we're working on a human resources project. I'm involved, the executive vice-president is involved, and the director of information systems is involved. Of course, human resources is also involved in this. By each of us putting in our own point of view, we'll end up with a better application.

Did the IS director at Fishking ever report to you?

No. IS reports to the executive vice-president. Prior to [IS director] Eric Parker's hire, I was responsible for information systems. But with his arrival, it was decided that we would all work with the executive vice-president as coordinator.

Do you like having IS as a separate entity? Does it work at Fishking?

The way we operate, it works just fine. All of us can interact with IS so that the needs of each of the major components of the business can be met. We also share and help each other with problems.

How do you make joint projects flow smoothly?

As with any partnership, it has to start with respect for the skills and abilities of the other party. The next step is to complement each other's skills and try not to dominate each other. Sometimes both partners may not agree during the initial stages of planning, but before the project can be implemented, the goals have to be agreed on by all parties.

Sometimes through interacting. Eric and I conceptualize what has to be done. In such cases, neither of us has grasped the full concept, but by working together we agree on one. That's where partnership and working together come in. That's also one of the reasons why we are successful.

When CFOs get involved with IS, do they usually see themselves rolling up their sleeves?

You'll find a variety of models. I do get involved to some degree technically because I have some technical knowledge.

What other kinds of CIO-CFO relationships have you seen?

There really is no rule. I know of one financial executive who became an IS director. I also know an IS director who became the CFO.

Is it really possible for a CIO and CFO to work as peers if IS is subordinate in some organizations?

There are two issues here. One is the table of organizations. The other is relationships. Sometimes you can't be too sensitive to tables of organizations — it's in personal relationships where you'll find the greatest success. •

One for all

As director of MIS at Fishking Processors, Inc., Eric Parker understands the importance of creating and maintaining IS partnerships with business unit managers throughout a company.

While Fishking employs more than 500 people, its top management is made up of a tight-knit handful of professionals. In this structure, Parker not only works as a partner with CFO Victor Deutsch but also maintains similar alliances with the top managers of all the business units within Fishking. Collaborations can be effective without being exclusive, Parker says.

In fact, for an information systems department, even the appearance of favoritism is counter-productive.

"My partnership with the CFO is like my partnership with the vice-president of production and the vice-president of sales," Parker says.

"Everyone's equally important in the organization. After all, from each group's perspective, they're the most important. That's why we have to look at them all," he explains. "Our job is twofold: One, we have to be technicians for the computer systems; two, we also have to be businessmen."

Parker stresses that IS must understand the company business from all aspects so that it can provide necessary support.

"That may mean that we have to learn production and planning and accounting," be says. "We also have to know how the senior executives want to see information reflected in their reports so that they can make the management decisions needed to take the company forward."

JANET FIDERIO

Help! My software maintenance is out of control!

Better software documentation can save your budget

BY ROBERT L. GLASS

Software maintenance documentation is a mythical product that everyone believes in but almost no one ever does successfully.

Everyone believes in it because the payoff of doing it right is tremendous: Good documentation can greatly reduce the enormously expensive cost of maintaining software. (Bear in mind that maintenance is the most costly software task.) With such potential savings, who wouldn't agree that software maintenance documentation is worth doing right?

Yet, only a handful of corporations ever do a decent job of chronicling changes, updates and improvements to their code. Why?

When crunch comes to shove, most information systems managers and programmers value short-term goals a lot more than long-term payoffs. For many, meeting software development costs and schedules is far more important than anything else — including quality and, especially, documentation.

However, there are changes afoot. An increasingly choosy federal government is insisting more and more that contractors scrupulously document all code development and maintenance during a project's entire life cycle. The body of academic research about the subject is rapidly increasing — both in the U.S. and abroad. This suggests several new approaches, which promise to give IS managers a systematic way to prevent routine maintenance tasks from devouring huge chunks of their budgets.

The carefree days of doodling around with software code clearly are numbered.

Glass is president of Computing Trends, a software engineering education and consulting company based in State College, Pa.

Too little, too much

If the failure of commercial software documentation, such as user manuals, has been spectacular, that of maintenance manuals is far more insidious — and costly. Software maintenance consumes well over half of the typical organization's software budget — sometimes reaching up to 80%. In many shops, more time is spent trying to understand software than on any other maintenance task.

The theory is that good documentation can help software maintainers more easily attain this costly understanding. Unfortunately, however, the state of this practice is abysmal.

At one extreme, documentation is squeezed out by time constraints and budgetary pressures during development. At the other, too much documentation is written, and it becomes a bulky package quickly rendered outdated and worthless as the product evolves. Most IS organizations fall into the former category, Department of Defense providers into the latter. In either case, the result is a lack of usable documentation to support software maintainers.

The realization that IS generally does a pitiful job of documenting software maintenance is hardly new. Nearly 20 years

Marty Braun

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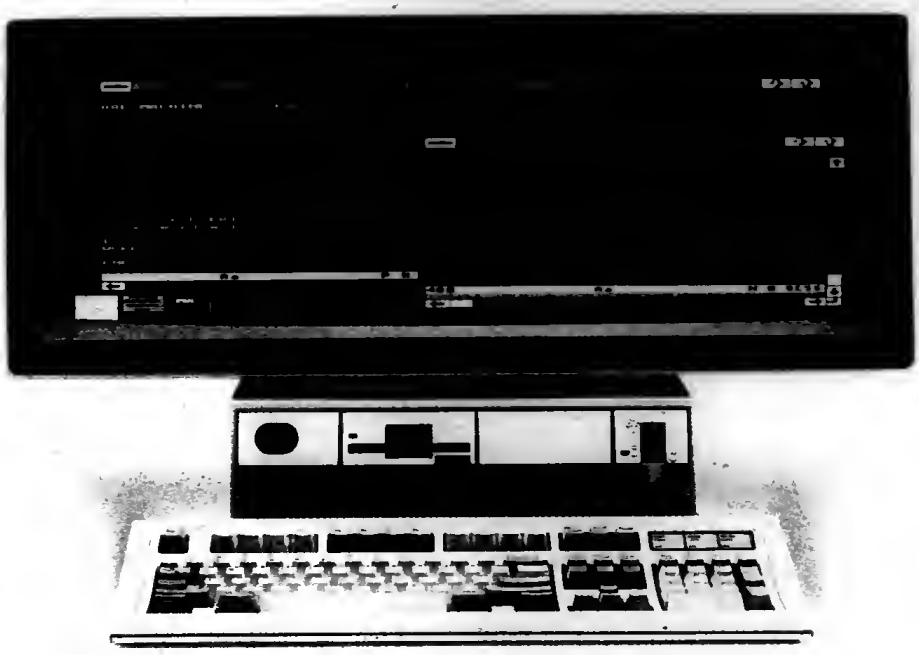

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ago, a popular textbook on managing computer software stated: "There is virtual unanimity in the computer industry on the importance of software [maintenance] documentation ... Despite this fact, it is the first of the cargo to be jettisoned on a floundering project."

Sadly, the situation did not improve in the 1970s and '80s. In 1989, William Sasso at Anderson Consulting quoted a software maintainer as saying, "I'm going to assume this is typical maintenance documentation — not worth the paper it's written on." Fortunately for IS, however, good news is on the horizon.

Good news

One hopeful sign is the blossoming interest in software maintenance research. New centers to explore maintenance, among other areas, have been established at the University of Durham in England and at the software engineering consortium formed by Purdue University and the University of Florida. In addition, the University of Michigan, Arizona State University and the Microelectronics and Computing Consortium (MCC) are also notable for conducting ongoing research into maintenance. Improved software documentation will be among the expected benefits of these explorations.

IRONICALLY, while new research will actually complicate matters temporarily, it already has borne fruit by suggesting some practical applications.

The other good news is a growing willingness by corporate and software management to explore new approaches to the problem. A major long-distance telephone supplier is one company investigating the use of technical writers to generate maintenance documentation — a riskier idea than it seems.

The reason is that a person writing software maintenance documentation must be able to effectively address readers who know a great deal about software. In order to understand what to write, he must also know how to read code.

Taken together, both tasks become formidable obstacles for many technical writers. Nevertheless, careful screening and hiring of tech writers has yielded success for a few pioneers of this approach.

Key research findings

Ironically, while new research will complicate matters temporarily, it already has borne fruit by suggesting some practical

INTERVIEW

Quality through documentation

IS quality includes good software maintenance documentation, says William E. Perry of the Quality Assurance Institute. He offers some tips for improvement

William E. Perry is executive director of the Quality Assurance Institute, a 10-year-old Orlando, Fla.-based group that counts among its 1,000 corporate members Fortune 500 firms, large banks and government agencies. A key part of the institute's mission — improving the quality and productivity of information systems — is to help members improve their software documentation. Perry recently spoke with Computerworld *Senior Editor Joseph Maglitta.*

What is the cost of poorly documented software? Why should organizations be concerned?

Firms should be concerned because they spend more money reworking the poor work they've done than they do solving customer's needs. We estimate that 70% of the entire IS budget is rework, and only 30% is productive, valued-added work. We can substantiate that. It's an economic issue.

Why do programmers hate to document?

In my opinion, the documentation they are asked to do is not what they need to do their job. They don't see the value to it.

When do you know your software systems are about to hit the maintenance hazard zone? According to the Quality Assurance Institute in Orlando, Fla., look for the following:

- **A large percent of your IS budget is going to maintenance.**
- **The cost of maintenance per thousand lines of code or function points is increasing.**
- **You have "black hole" applications that absorb expensively large amounts of maintenance dollars.**
- **You get frequent customer complaints about software quality.**
- **You have large change backlogs.**

How did that come about?

Many of the standards in IS are developed by what people think is a good idea rather than by a scientific approach of what they need to do their jobs. Someone feels it would be good to have a flow chart, so they add a flow chart. But they don't use [a scientific approach] in the maintenance activity.

It seems that more attention is now being paid to software documentation. Why?

The government has standards relating to quality, and they have forced the defense contractors to get better. They are beginning to ask for detailed measures throughout the life cycle, so they want to know what percent of requirements have been documented correctly. This effort has been going on for the last 10 years, but it's intensifying now.

What has caused it to intensify?

Two things: cuts in the defense budget and the poor quality of software that is being delivered to them.

Is there any way to accurately gauge the cost of poorly documented software maintenance?

We teach a concept called "The Cost of Quality," which is the cost of failure. Internally, within information systems, this is excess of cost required to do maintenance. Externally, it is the cost of reruns, user rework and problems to the corporation.

You can easily identify the internal cost by calculating the cost to maintain a thousand lines of code or a thousand function points. You see tremendous variance between [software] systems, then you investigate the cause of the variance, and that usually identifies the bad practices and bad systems. Payroll vs. accounts receivable vs. invoicing, for example.

Besides figuring costs, what other things can firms do to improve their methods of documenting changes?

Our basic method is to standardize the processes and then put in a continuous, measurable improvement program. The whole thing takes five to seven years, which is why corporations are not excited about it. It's not quick.

Gary Ingbert/Picture Group

Does this process require consultant support?

[Users] pretty much have to do it themselves. If they don't create their own processes, they won't use them. The culture change is the hardest.

What can organizations do to help foster that kind of change?

It basically starts with the chief executive officer.

You advocate treating software as a business asset. Where does the issue of software maintenance documentation fit in?

We perceive that if software is viewed as an asset, you undertake what in accounting is called an asset management program, and you protect your asset. In information systems, we permit our systems to deteriorate architecturally. As they grow in size — and there are normal growth rates for software — they deteriorate architecturally.

It's like taking a building and cramming more people in it. It gets worse and worse, and the cost of maintenance increases. So, the architectural solution is re-engineering, and re-engineering requires measurement to make it effective.

Where does the process fall apart?

We have maintainers, but we do not have a manager of the maintenance process. No one oversees the process; it just happens. Anybody maintains any way they want to. [Programmers] are "artists."

It's very costly to do documentation. We don't have good standards and good process, I'm talking industry in general; some corporations do it well.

Can you name some?

The companies that seem to do it well are the vendors of software; the NCRs or the IBMs. They understand the cost of maintenance and the value of it better. Primarily, the defense contractors — GTE, Boeing Computer Systems, those types of organizations.

Do you advocate creation of a position that would oversee the function?

We believe that is the quality assurance function. Quality is responsible for the process — they're the equivalent of industrial engineers.

Are there any technological solutions, such as voice annotation or hypertext, that would help the process?

Those kinds of tools basically automate the process, but you first have to have a process. The problem is not a technical solution; it's a people/business solution.

If you had to choose the biggest challenge of software maintenance documentation, what would it be?

To recognize that there is a problem. My perception is that most IS directors feel that they are doing [documentation] well now — and they're not. I always liken it to Alcoholics Anonymous; you don't go until you know you're an alcoholic. You have to say "I have a problem." That's where I think IS is — they think they're doing well in this area. And we statistically can show that they are doing poorly.

applications. The following is a brief overview of some of the most important findings:

• **Characteristics of documentation.** Researchers at the University of Durham have identified several desirable properties of software maintenance documentation:

1) It should be incrementally built and casually updated.

2) It should be consistently available for team use.

3) It should be based on the source code.

4) It should be supported by automated documentation tools (such as cross-reference listers and call-structure generators).

These new ideas are particularly valuable when combined with existing knowledge. In the book *Literate Programming*, Stanford University's Donald Knuth suggests that the commentary in code may be as useful as the code itself. He proposes the idea of text-like commentary code, with the actual source code embedded in the text, rather than the more traditional text embedded in code. This is perhaps a radical extreme, but it emphasizes the vital role of code commentary in maintenance documentation.

• **The best form.** Recent work by MCC's William Curtis casts new light on the best form of documentation. In a series of experiments, Curtis shows the most correct and easy-to-use maintenance documentation was created in "constrained language," his term for a pseudocode form of design language. The second-best documentation form, be reported, was "ideograms" (i.e., pictorial views, such as flow charts). By far, the worst was natural language (English) text.

• **The best documentation strategy.** Examining the kinds of things that should be documented, Elliot Soloway at the University of Michigan contrasted a "systematic" strategy vs. an "as-needed" strategy of software documentation. His experiments show that organisations using the systematic strategy — studying the whole program in question rather than just the portion that apparently needs to be changed — nearly always obtain successful changes. In contrast, be reports, the as-needed approach fails 50% of the time.

Soloway concludes that "delocalized plans" — the physical separation of the software into isolated ideas and modules — should be overcome by documentation that fills in the gaps between the plans.

• **The best person for the job.** Nancy Pennington at the University of Colorado investigated the relative importance of software knowledge and application-domain knowledge in software maintenance. She finds that the highest levels of software comprehension result from maintainers fluent in both.

Important philosophies

These key research findings can be drawn together to form a strategic approach to software maintenance documentation in the '90s. But before concrete action can be taken, a solid conceptual grounding is needed. The following three philosophies are key:

• **The listing philosophy.** Clearly, maintenance documentation must be focused on the code itself, in the form of articulate and useful commentary. Thus, a listing philosophy becomes one of the keystones of good software maintenance documentation. It is also necessary to list what kinds of commentary should be inserted and where.

Done this way, detail-level commentary is the cheapest alternative. It is also more likely to be kept updated, because commentary is physically located with the other code material and is easily accessed by all members of the maintenance team.

• **The blueprint philosophy.** It is also clear that commentary in the listing cannot do the whole job. More global concerns must be satisfied by the maintenance that documentation must satisfy, such as a product overview and pointers from higher levels of product description, into the detail commentary.

IS organizations can benefit from a blueprint philosophy for this level of more traditional written documentation. This term refers to a hierarchical approach, much like that used in the traditional engineering blueprint.

In this schema, top-level documents point downward through a chain of medium-level documents to the most detailed. Conversely, bottom-level details point upward through the same chain to top-level concepts.

Much of this documentation, as shown by University of Colorado's experiments, can be — and apparently should deal with — the design documentation produced as the product was conceptualised. It should also be kept up-to-date with the as-built product.

Thus, hierarchical data-flow diagrams and structure charts as well as pseudocode of the design phase become the second important factor in the eventual maintenance documentation. Once again, the expense of creating the documentation is lowered because existing artifacts form an important part of the product.

• **The "philosophy" philosophy.** Supplementing such technology-specific views should be a "philosophy" philosophy — one aimed at recording thoughts and strategies of the designers and coders for later use by the maintainer. This procedure should answer questions such as "Why did the developers do it this way?" The resulting answers can be invaluable to the maintainer, who is trying desperately to understand the developer to figure out what to change and how.

One key condition is that such philosophic understanding helps globalise "delocalized" concepts in the listing. Another is that they must record application information as well as software construction information.

After years of despair, research can finally help guide IS managers in developing an effective strategy to finally help the myth of software maintenance documentation come true. The following are some suggested steps.

First, focus detail documentation efforts on the listing. Make sure that commentary is present and understandable and ensure that it is kept current during maintenance.

Second, focus higher level commentary efforts on the hierarchical, blueprint-like design documentation produced during development. Once again, make sure that documentation is created and understandable and check to see that it is kept current during maintenance.

Finally, support the above documentation with a product overview and information on the philosophy and decision-making of the developers.

Using this three-step process can minimise the cost of creating documentation and maximize the usefulness of the final product.

How well such new, research-driven strategies replace older, erroneous approaches will depend heavily on IS management. The coming decade will show how much IS really cares about the devasting cost of poor software maintenance documentation. •

MORE GLOBAL concerns must be satisfied by the maintenance that documentation must satisfy, such as a product overview and pointers from higher levels of product description into the detail commentary.

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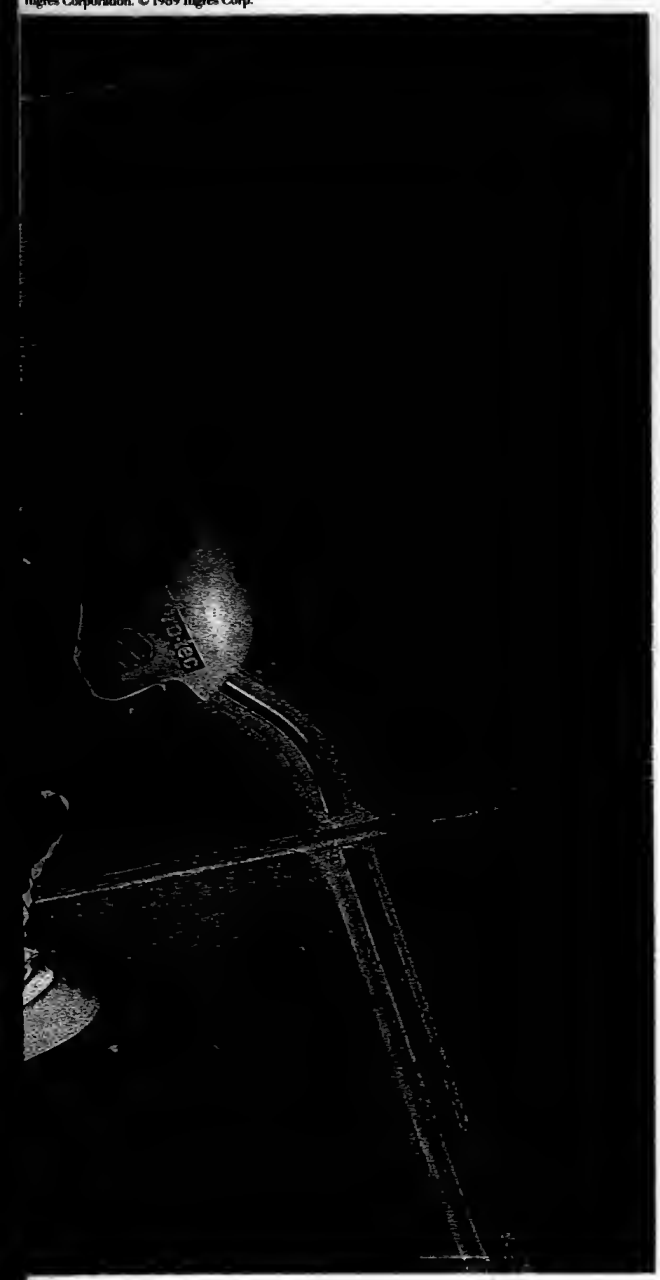

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INDUSTRY INSIGHT

Dennis Hayes

Malign neglect

Quietly, the U.S. electronics industry is piling up incriminating evidence of negligence that could inflict epidemic-scale disease on the country. In the process, it is making a strong case for social control of technology production.

The industry is a leading consumer of solvent chlorofluorocarbon (CFC 113) and methyl chloroform. These are greenhouse gases that heat up the earth's surface. They also shred the ozone, allowing dangerous ultraviolet solar radiation to strike the earth's surface and those who inhabit it. The industry continues to use these chemicals despite safe alternatives.

The human afflictions linked to ozone-related radiation alone — cancers, cataracts and immune disorders among them — may dwarf all prior incidence of chemical- and stress-related disease in the electronics industry. *Hippocrates*, a consumer medical magazine recently renamed *In Health*, recently reported that the chances of contracting skin cancer have increased fifteen-fold and are 1 in 100

Continued on page 100

Conner birdies 3rd

After 3 years, disk drive start-up leads the field

BY CHARLES VON SIMSON
CW STAFF

SAN JOSE, Calif. — When Finis Conner walked off the final green at the Pebble Beach Pro Am Golf Tournament recently, he found himself in an unusual situation. Conner, chairman, chief executive officer and founder of Conner Peripherals, one of the last Silicon Valley hardware high-flyers, was well back in the pack.

It is a situation familiar to Conner only on the golf course. His company recently cemented its place in the corporate history books by announcing revenue of $704.9 million for fiscal 1989, its third full year of operation. That makes Conner a leader as the fastest growing manufacturing start-up in history. Conner takes the prize from Compaq Computer Corp., which did not post similar results until 1986, its fourth year in production.

"As a company, we are in an interesting position," Conner said. "The challenge for us is simply to work as hard as we can to manage this phenomenal growth."

Today, Conner holds an estimated 90% of the hard disk drive market for laptop computers. The company supplies drives to Compaq and Zenith Data Systems, the top two U.S. laptop makers, and to top Japanese firms Toshiba Corp., NEC Corp. and Sharp Corp.

While competitors loom, they remain distant. Seagate Technology, Inc. and Prairietek, Inc. have both introduced 3½-in. hard disk drives that compete with the mainstay of Conner's product line, but these new drives have not taken hold in the market as yet, according to Bob Katsive, an analyst at Disk/Trend, a Mountain View, Calif.-based market research firm. NEC and Toshiba are also manufacturing hard drives for larger systems and will ultimately take a chunk of the market simply by supplying their own laptop and notebook assembly lines, Katsive said.

The threat does not seem immediate, however. "Heck, even the Japanese are buying their drives from Conner," Katsive said. "For the moment, it is too early to judge how other entries might play."

The company was started in 1986 largely as a captive suppli-

Continued on page 96

Up & Coming:
Conner Peripherals

Chairman: Finis Conner
Number of employees: 5,200
Headquarters: San Jose, Calif.
Product description: Disk drives
Representative quote: "The challenge for us is simply to work as hard as we can to manage [our] phenomenal growth."

U.S. competitiveness seen in peril

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — The U.S. computer industry faces rough times ahead, including the prospects of an Asian cartel controlling the semiconductor market and foreign challenges in the software field, according to a long-range assessment published by the National Research Council.

Retaining U.S. preeminence in computer technology will require better planning and leadership by industry and government, rather than a business-as-usual approach, the report warned. "Incremental tinkering at the margin will not be enough," it said.

The report, "Keeping the U.S. Computer Industry Competitive," resulted from a May 1989 colloquium on competitiveness sponsored by the council's Computer Science and Technology Board.

Speakers at the forum warned that problems in the U.S. semiconductor industry will not be confined to the electronics industry if current trends continue.

"The dominance of a few integrated Asian firms in important semiconductor technologies vests these companies with the potential for cartel-like control over inputs essential to U.S. computer manufacturing," the report said.

Speakers also warned that Japan and Europe are gearing up to challenge the U.S. software industry. They noted that the European Community is making progress in formal methods of software engineering and that 40 Japanese companies are participating in a joint research project to improve software development accomplished with the Unix operating system.

"The openness of Unix," said James H. Morris, professor of computer science at Carnegie-Mellon University, "makes it an ideal place for the Japanese to enter the U.S. software market. Look out."

While the U.S. has been the

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- HP accused of cleaning its image, not environment. Page 100.
- IBM tries out restructured sales group. Page 100.

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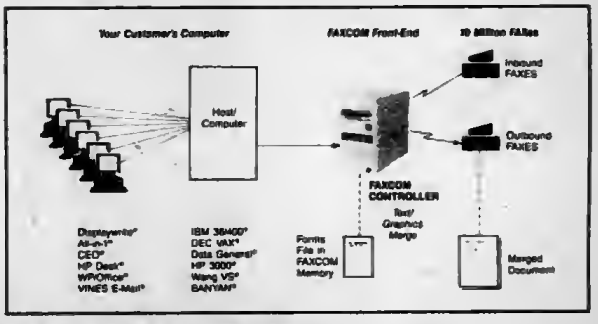

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IN BRIEF

To catch a chairman

With long-sought new Chief Executive Officer **Ronald Fisher** secured and settling into the front office, recently shot-down high-flyer **Phoenix Technologies, Ltd.** has come up with a new game plan for attracting the topflight outside directors the ailing firm sees as key to its return to dynamic growth: Founder and Chairman **Neil Colvin** will cede his title, leaving the chairmanship available as a lure to new talent. Colvin will remain at Phoenix as senior vice-president and chief technical officer.

Parallel pursuit

Computer industry corporate veteran **NCR Corp.** and **Teradata Corp.** — *Inc.* magazine's pick as fastest-growing small company of 1989 — are joining forces to aim parallel processing technology at the general-purpose commercial market. Under a joint-venture agreement announced earlier this month, $6 billion NCR will also take an initial 10% equity position in $137 million Teradata.

Call me Fellow

Eight years of operating systems software development tagged **Intel Corp.** microcomputer component group software technology director **Richard Wirt** with the nickname "Mr. Unix," according to the company. Last week, Wirt's efforts earned him a title that you don't have to spell quite so carefully: **Intel Fellow.** Also honored with the highest-ranking position at the firm was **Peter MacWilliams.** Only six Fellows have been named in Intel's 22 years.

No news is good

News of hard times in the computer and the oil industries apparently hasn't reached **Convex Computer Corp.** The supercomputer player announced fourth-quarter earnings of $3.7 million last week, up 68% from last year's fourth quarter on revenue of $46.7 million, a 52% year-to-year increase. CEO Robert Paluck credited strong demand from the geophysical processing market as with fueling firm's success.

Back in the U.S.S.R.

Boston-based Innovation International, Inc.'s third Soviet-American joint venture company will wed Innovation's hardware to Russian language teaching software developed by the **Plekhanov Institute of the National Economy,** the U.S.S.R.'s leading business school, according to Innovation CEO Frank Wright. The enterprise, dubbed Compling, will be based in Boston and Moscow.

Fog shrouds future of Siemens' bid for Nixdorf

ANALYSIS

BY NELL MARGOLIS
CW STAFF

West German technology giant Siemens AG's bid to acquire faltering Nixdorf AG could create a bailout of stunning proportions.

However, analysts and users who viewed the prospects during the weeks since the largely undetailed acquisition announcement in mid-January generally agreed that an abundant bundle of "ifs" make it hard for both users and investors to know whether to cheer or fear.

The proposed deal appears to leave the scene littered with winners: Siemens gets a tighter lock on its first-place position among Europe-based computer companies, Nixdorf gets saved from possible financial catastrophe, and users get to enjoy the technological fruits of the union.

However, analysts noted, the scenario is riddled with "ifs" — the first of which is "if the deal goes down." Approval by both the German Federal Cartel Office and the European Economic Commission could take six months. A promised late-January announcement from Siemens supplying at least some detail about the game plan has yet to issue. Which — if any — of the currently unknown specifics may prove a spanner in the works is already causing some consternation.

"I'm waiting for more bad news to be revealed out of Nixdorf — bad news that Siemens doesn't know about yet," said Estela Piscope, an analyst at BHF Securities, Inc. in New York.

Said Gregory Francfort, who follows Siemens at First Boston Corp., "What it comes down to is that we really don't know what their plans are."

Culture clash?

Assuming the merger is consummated, several analysts said, its success is far from assured. One question is that of how quickly and how well the corporate cultures of Siemens — regarded as a model of traditional corporate mores — and the archetypally entrepreneurial Nixdorf will meld. Another, said BHF's Piscope, is that of timing: Making a major acquisition at the onset of a cyclical industry downturn, she said, well might prove a costly and unwieldy mistake for Siemens.

There are the issues inherent in all technology company mergers: Where product lines overlap, whose will survive? Where they differ, will the result be harmony or cacophony?

All of the above loom as possible concerns to Nixdorf users such as Nordstrom's Department Store in Seattle, said point-of-sale software development manager Karen D'Agostino. The 60-store chain is roughly one year into a project that has 10 stores up and running on Nixdorf systems, with three more in training.

If the Siemens buyout takes nothing away from Nixdorf but the financial cloud now blotting its horizon, D'Agostino said, it will be good news to Nordstrom's. On the other hand, she added, an acquisition that saves Nixdorf, but, for instance, wipes out all or part of its product line in the name of curing redundancy will be anything but. "My No. 1 concern would be the actual hardware production," D'Agostino said. "Corporate culture problems don't bother me as much."

Uncertainties notwithstanding, a late January announcement from Nixdorf served to remind users that in this case, the devil they don't know might be safer company than the devil they do. Nixdorf, which lost an estimated $585 million in 1989, said that it will lay off some 16% of its worldwide work force by July 1 and to cut both research and development spending and worldwide production.

Conner

CONTINUED FROM PAGE 95

er to Compaq. Compaq Chairman Rod Canion knew Conner as the founder of Seagate, today one of Conner's top competitors. At the time, Compaq was looking for a company with development and production resources that would remain focused on supplying 3½-in. drives to Compaq's laptop division.

Compaq provided early investment in Conner and accounted for more than 90% of Conner's revenue through the first year of operation. But as the overall laptop market grew, demand outside Compaq boomed. Compaq accounted for 42% of Conner revenue in third-quarter 1988, and 26% for the same period last year.

In addition, through new stock sales by Conner and a recent Compaq sale of one million of its 13.6 million Conner shares, Compaq's stake has decreased somewhat from the 40% it held in July 1989.

Risk control

Conner's strength comes from no area more than from its ability to control risk through demanding some up-front commitment from customers, either in the form of direct investment or commitment to purchase a certain number of drives once they are ready to be shipped.

"We are able to reverse the traditional way products are developed: design, build, sell," said C. Scott Holt, executive vice-president of sales and marketing at Conner. "We sell, design and build, and that has helped us avoid innumerable problems."

But no company growing as fast as Conner can avoid growing pains, and the company felt a twinge at the end of 1989. During that time, demand for Compaq's notebook computer, introduced in October, began to heat up, and Conner was unable to supply enough 3½-in. drives to keep Compaq's production lines rolling.

The shortfall was traced in part to manufacturing problems that Conner executives say led to some changes in the way manufacturing processes were managed. Basically, however, the glitch was a result of an unexpectedly fast ramp-up of the product line.

That, Holt said, is part of the danger of up-front capacity planning. "The ramp of a company like Compaq is significant," he said. "When the notebook product took off, there simply wasn't enough time to smoothly transition to high-volume facilities in Singapore. You always hope for that type of demand, but it can be difficult to plan for."

On top of its game

Since Conner Peripherals' first year of production in 1987, its earnings jumps haven't been equaled by anyone

The demand does not look as though it will tail off any time soon. Analysts say that even with PC juggernaut Compaq's growth slowing in recent quarters, the PC and notebook market is booming, and Conner is ahead of the pack on the smaller, higher density drives the market will demand.

While competition is likely to intensify and the Japanese and others may buffet Conner's margins and market share, Conner is likely to be behind only on the golf course for at least another round.

Competitiveness

CONTINUED FROM PAGE 95

world leader in software, it "is an area where we have to learn how to remain strong, rather than take it for granted," added Samuel H. Fuller, vice-president of research at Digital Equipment Corp.

The report stopped short of calling for a national industrial policy but said more cooperation among industry, government and universities is needed to keep the U.S. computer industry competitive.

"Whether we succeed or fail depends on how we manage our businesses and how the government manages the business environment," said John L. Doyle, executive vice-president of Hewlett-Packard Co.

Several speakers also noted the need to debunk the popular myth that innovation in technology is mostly driven by individual entrepreneurs. "Many software projects, especially those having considerable risk and which have lengthy development periods, cannot emerge from such an environment" and must be supported by large firms, said Laszlo A. Belady, vice-president of Microelectronics and Computer Technology Corp.

> FAR MORE cooperation between industry, government and universities is needed.

Ultimately, participants said, education and infrastructure will determine whether the U.S. will be a technology leader or a has-been. Panelists called for restructuring educational curricula to make computing a "more integral part" of educational activities and endorsed the federal proposal for a National Research and Education Network.

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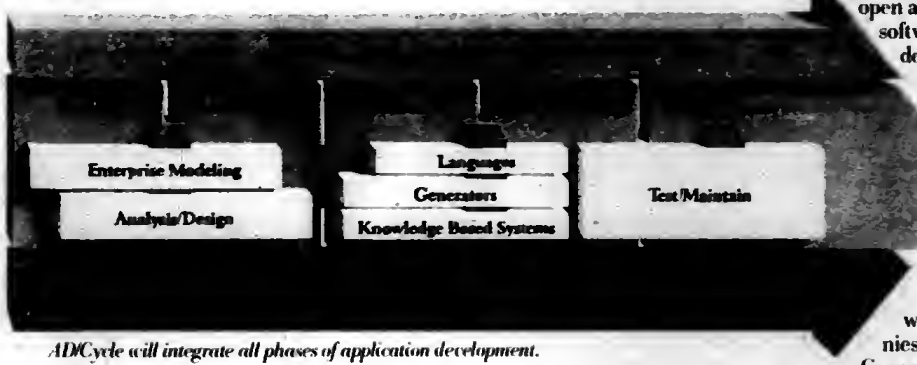

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IBM takes cue from Gorbachev

Computer giant tries Midwest perestroika to increase power of branches

BY ELLIS BOOKER
CW STAFF

CHICAGO — *Perestroika*, IBM-style; has come to the Midwest.

In what it said could be a blueprint for the company to give local officials greater decision-making power, IBM launched a six-month experiment with a new sales and marketing structure earlier this month.

Executives in IBM's Midwestern offices disclosed the details of a new organization that puts more power in the hands of branch offices and consolidates the consulting services formerly offered to customers through a variety of national-level IBM organizations.

According to Pat Payne, vice-president and general manager of the Midwest area, the new structure is essential if IBM is to achieve the goal of a "market-driven" company articulated by IBM Chief Executive Officer John Akers in 1987.

"As we tried to develop business solutions for customers, not just sell products, we saw the need to have more authority to do these things ourselves," he said.

Payne explained that the project is being described as a "test" only because some details of its implementation have to be worked out.

One of those kinks could be how the local region coordinates its activities with IBM's national organizations such as the IBM Information Network, National Service Division and others, particularly for projects that sweep across regions.

On the plus side

However, the risks of organizational conflicts are outweighed by the advantage to customers, Payne said. That advantage comes down to responsiveness. "We want to do in six weeks what it has taken six months to do in the past," he said.

In addition, a new operation, IBM Consulting Service-Midwestern Area, will be established in Chicago to pool the resources of the formerly national entities. An IBM Consulting Services office has also been opened in IBM's Minneapolis-based central area. Payne called the Consulting Service a two-year "transitional phase." The ultimate goal, he said, is to have "solution units in every branch office."

However, some local customers seemed to doubt whether IBM can provide unbiased consulting services. Others worried that it will not be able to add the expertise locally to make this happen.

"I've been in the business some 30 years, and one of the first truisms you learn is no matter what IBM tells you, they're out to sell you hardware or software," said Don Schuman, director of information systems at Ace Hardware Corp. in Oakbrook, Ill.

Schuman, nevertheless, had few complaints about IBM's field service responsiveness.

That feeling was echoed by other users in the area, including Nathan Taylor, executive director of corporate computer services at Encyclopaedia Britannica USA in Chicago.

"We haven't had response-time problems, and we never had the impression they needed more time to go beyond the local level," he said.

Regarding the consulting services, Taylor also was skeptical of IBM's impartiality, although he said he was sure the company would be able to attract quality people for this role.

IBM's Midwestern region covers Illinois, Indiana, Missouri and part of Western Kentucky and claims 26,000 customers.

HP plant overlooks some hazards in clean-up plan

BY J. A. SAVAGE
CW STAFF

CORVALLIS, Ore. — Hewlett-Packard Co. likes to project a "do-good" image where environmental issues are concerned.

However, while the firm's new wafer fabrication plant is using the opportunity of new construction to substantially lessen its use of ozone-depleting chemicals, it is missing the opportunity to cut down on other hazardous chemicals discharged into the air during chip- and board-making, according to environmentalists.

HP countered that the processes environmentalists want it to use remain unproven.

The most recently controversial chemicals used in the electronics industry are chlorofluorocarbons (CFC), tagged as culprits in depleting the earth's ozone. CFCs are used as a degreaser. In the past, they have been left to evaporate into the atmosphere.

There are two current alternatives to CFCs. IBM uses soap and water, the same process that the whole industry used until the late 1970s, when CFCs became widespread. AT&T is pioneering the use of an orange peel-based cleanser. In its new plant, HP will veer toward the former, using a water process that eliminates the need for CFCs, said L. K. Loh, environmental specialist for the site.

HP promised Oregon's Department of Environmental Quality that the company would eliminate the need to add more CFCs with the new plant. As processes are switched over from the old chip plant, on-site CFC emissions will be reduced. Dragan Ilic, general manager at HP's Northwest Integrated Circuits Division, said CFC emissions in 1990 will be down 70% from 1989 levels, leaving emissions of 15,000 pounds annually.

Nontoxic substitutes

HP officials said the company may adopt nontoxic substitutes or recycling to replace other chemicals, such as sulfuric and hydrofluoric acids, some time in the future. But environmentalists —particularly those in California's Silicon Valley who have monitored electronic industry pollution for years — said HP is missing a golden opportunity to build its plant right from the start.

HP's Ilic *says CPCs will be down 70% this year*

"HP has the luxury of starting at the beginning," said Ted Smith, director of the Silicon Valley Toxics Coalition. Implementing substitution chemicals and recycling right from the start, he said, could also save the company money. "It's the retrofit that many companies say is what's costly," Smith said.

He claimed that certain acid recycling machines available "off the shelf" will contain and reuse 95% of the chemicals. Currently, acids get dumped into a neutralizing pit where caustics are added and then evaporated or flushed to sewage treatment. The constant need for new chemicals and the expense of sewage treatment both show up as costs to the company.

HP's Loh acknowledges the high cost of the current method, but still will not implement recycling from the start. "It could potentially save a lot of money — if it was a proven technology," he said. HP will be monitoring itself for air emissions and turning the information over to the state.

Hayes

FROM PAGE 95

for a Caucasian newborn. By one estimate, each 1% decrease in stratospheric ozone results in 100,000 new cases of blindness from cataracts. The electronics industry's negligence is not exclusive, but it is striking:

- Unlike older CFC-using industries, U.S. electronics began using CFCs in a big way *after* not only warnings, but bans, were issued.
- Far from dabbling in CFCs, U.S. electronics firms soon became leading consumers, designing an estimated 200 processing technologies around exclusive use of CFC. In effect, U.S. engineers wrote CFC and methyl chloroform into the manufacturing specs for the global electronics industry.
- U.S. electronics invited widespread use of an ozone killer more lethal than CFCs: halon. Unlike water, halon puts out fires without damaging computer equipment. The spread of computers sped the move toward halon-based fire extinguishers.
- Computer keyboard aerosol cleaners that spray CFCs are sold over the counter daily.
- At considerable expense and effort, the U.S. electronics lobby has dealt a crippling blow to legislation that would phase out CFCs. The legislation is a Clean Air Act amendment reflecting the latest Montreal Protocol agreement (the May 1989 Helsinki accord). While it claims to uphold the protocol, the American Electronics Association nevertheless lobbied to strip language that would ban U.S. imports of products made with CFCs. This creates a back door: While complying with a domestic phaseout, U.S. electronics firms can continue (and increase) their CFC-based production in Asian and Pacific Rim countries exempt from the Montreal Protocol. It also shows how industry treats environmental problems: as public relations matters without worldly consequence.

As it is, the industry could phase out most solvent CFC and methyl chloroform immediately, since water-and-detergent and orange-peel-and-wood-pulp cleaners have existed for years. These clean at least as effectively as CFCs. New approaches are emerging, including ones that eliminate the need for cleaning. More would follow quickly with a concerted effort. With few exceptions, the industry is stalling, milking its ill-considered investment in CFC processes behind a showcase endorsement of the Montreal Protocol.

We need, desperately, to stop using CFCs, methyl chloroform and halon. A comprehensive two-year phaseout of CFCs and methyl chloroform with technology transfer to developing countries is a good place to start. Skeptics should recall the overnight retooling of U.S. industry at the onset of World War II — as well as the two-year CFC aerosol phaseout in 1976 (most firms beat the deadline with months to spare). The ban also could serve as a corrective to a shallow and dangerous conventional wisdom: our presumed need for ever-faster processing technology. It's time to ask ourselves which new securities trading program, what enhanced missile guidance system, and how many new automated teller machines justify our courtship of New Climate.

Such a ban would not go far enough, though, because it would not alter the electronics industry's historic course of replacing bad substances (e.g., carcinogenic TCE) with bad, or worse, ones (e.g., CFCs). When our top scientists and engineers consistently choose technologies that we know to be dangerous in favor of those we know to be both safe and technically comparable, it is time to change the way we choose.

We must find ways to incorporate ecology and workplace safety into our technology decision making. This requires first transcending models that treat global warming and workplace injury as "external costs," and second not relying on government bureaucracies. Here in Silicon Valley, we have a priceless advantage: the most expansive research and development capability in the world. Will we choose to use it to develop atmospherically kind, workplace-safe technologies for an ailing planet?

Hayes is a Silicon Valley author and journalist.

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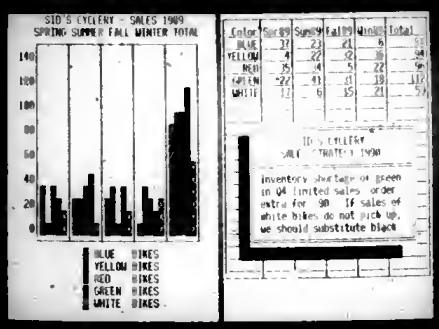

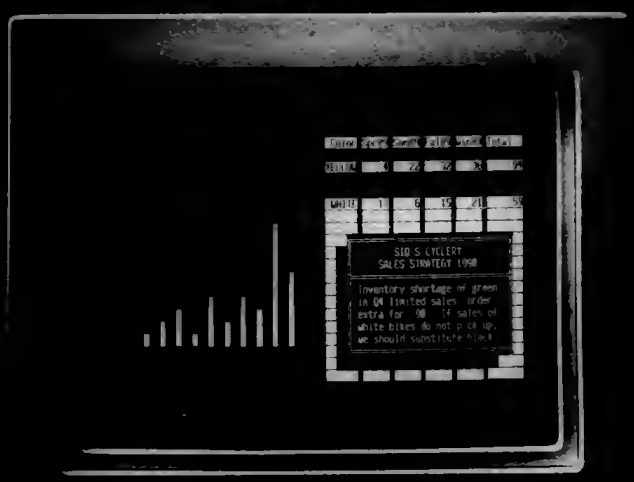

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Packing it up for Europe 1992

Falling trade barriers could create enticing career moves, but be wary

BY JOHN J. DAVIS
SPECIAL TO CW

Companies are accelerating preparations for Dec. 31, 1992 — the date for dismantling trade barriers among the 12 countries of the European Economic Community. As they do so, an assignment to Europe could spell opportunity for information systems executives.

It could also mean trouble. While the prospect of an overseas posting may seem glamorous, there are some practical considerations to bear in mind.

First, remember that companies spend millions of dollars transporting managers and maintaining them overseas. In return, they expect loyalty in the form of highly dedicated service.

It's also important to look at a European post in terms of its business value. If you're being sent to Paris to do work that might be handled from the home office with frequent trips, management might decide the post is expendable. As international business accelerates, shuttling between Europe and the U.S. will become more common.

In addition, you can't assume you're going to be stationed in trendsetting cities such as Paris, Rome or London. A posting in a less important location could bear limited career value.

It's critical to maintain close ties with corporate headquarters. Consider how long you'll be away. The typical European assignment used to last two years. With the cost of stationing executives abroad up sharply in recent years, the average is now

more like three years.

Be wary if your company plans to keep you overseas longer than three years; the more time you spend away from home, the more you can miss. You may, for instance, miss out on a key job opening back home that must be filled quickly.

Finally, think about whether a transfer is appropriate for your family. Living abroad is not to everyone's liking; it can be a romantic adventure for some and misery for others.

Such considerations notwithstanding, it's crucial to realize that senior management thinking on foreign assignments has turned away from traditional views as restrictions on trade dissolve. Once considered corporate exile — out of sight and out of mind from central office decision makers — today a European job is more likely to lead up the corporate ladder.

Working abroad can open other career doors, too. A high-level IS executive who has worked in Europe for a few years stands a good chance of being recruited by a European company. However, there are potential pitfalls. In European firms, salary scales are still low by U.S. standards. The IS function holds less status and clout than it does here. Many of the leading software packages are different; at a minimum, senior IS executives must be snowproof on the technology.

The great bulk of opportunities for U.S. managers in Europe are with U.S. companies, often in positions related to sales.

These companies are looking for special skills in their European managers. They include knowledge of tariffs and other international trade regulations as well as a grasp of multinational operations. The management of global networks, for example, requires dealing with a quiltwork of national regulatory bodies.

It's critical for U.S. executives to familiarize themselves with European labor policies. U.S. workers change jobs frequently, but our hire-and-fire attitude is alien to Europeans, who expect greater continuity.

Many countries, especially those in the Eastern Bloc, possess primitive telephone and postal systems. As a result, things don't happen quickly. Businesspeople frequently wait for hours or an entire day to make or receive important calls. Instant deal making does not exist.

Americans also must understand the culture and social customs of the countries where they're going to work. It's a mistake to assume that everyone does business the way we do. Throughout Europe it's considered rude to address people by their first name without invitation. Punctuality is a must.

The people of each country have their own styles and idiosyncrasies. The French, for example, waste no time getting down to business, yet they're painstakingly slow in coming to decisions. In Great Britain, protocol is respected as much as the monarchy. Business is confined to the office; lunch, dinner and weekends are for socializing.

Americans tend to be impatient. Their goal is to make a deal as quickly as possible, turn a profit and overtake the competition. Europeans, on the other hand, prefer to do things at a slower pace.

At European companies, there is typically greater importance attached to interpersonal skills in the screening of prospective IS executives. The practice stems from recognition of the need for cooperation across varied cultures.

WORKING ABROAD CAN open other career doors, too. A high-level IS executive who has worked in Europe for a few years stands a good chance of being recruited by a European company.

Compared with other IS professionals, telecommunications specialists tend to be more international in their knowledge and outlook and are therefore more likley to adapt smoothly to a European posting.

Before you charge off, think clearly and objectively about whether an overseas assignment is right for you. It's a lot more than a relocation. It can redirect your career and introduce a significant change in lifestyle.

Davis is president of John J. Davis & Associates, Inc., a New York-based executive research firm specializing in information systems management.

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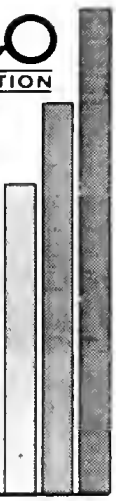

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Senior Systems Consultant to provide computer system consulting services or clientele conduct studies or obtain data and analyze data to advise on or recommend solutions, utilizing knowledge of database systems concepts and structures, confer with clients to ascertain specific systems requirements, develop database systems including state-of-the-art data communications or timesharing and networking capabilities utilizing knowledge of database concepts, structures and systems, data structures. Assemble languages and database concepts, specify logical operations and models of problems or solutions by computer confer with personnel to resolve questions of program intent, output requirements, input data acquisition, coding use and modification, and inclusion of internal checks and controls, devise sample input data to provide test of program adequacy, conduct special studies and investigations pertaining to the development of new information systems to meet current and projected needs. Applicants must possess Masters degree or Computer Science and must have taken college courses in external data structures, systems design and analysis or software development, networking, data communications or teleprocessing, data base systems or concepts and Assembler language. 40 hours, M/F 9 a.m. or 5 p.m. $34,000 per annum. Send resume and transcripts to Illinois Department of Employment Security 401 South State Street - 3 South, Chicago, Illinois 60605. Attn: Joan Sykstus. REF #9964-S AN EMPLOYER PAID AD

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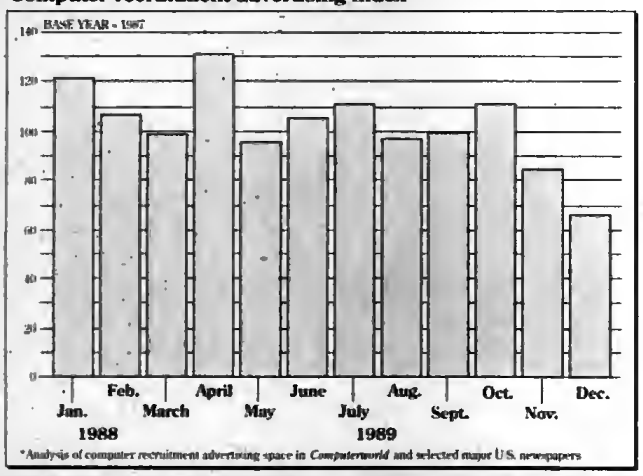
CAREER INDEX

Computer recruitment advertising index*



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   - 70 Mining/Construction/Petroleum/Refining/Agric
   - 80 Manufacturer of Computers, Computer-Related Systems or Peripherals
   - 85 System Integrators, VARs, Computer Service Bureaus, Software Planning & Consulting Services
   - 90 Computer/Peripheral Dealer/Distr./Retailer
   - 75 User: Other _____
   - 95 Vendor: Other _____ (Please specify)

2. **TITLE/FUNCTION** (Circle one)
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   - 10 Chief Information Officer/Vice President/Asst. VP IS/MIS/DP Management
   - 21 Dir./Mgr. MIS Services, Information Center
   - 22 Dir./Mgr. Tech. Planning, Adm. Svcs., Data Comm., Network Sys. Mgt., Dir./Mgr. PC Resources
   - 23 Dir./Mgr. Sys. Development, Sys. Architecture
   - 31 Mgrs. Supry. of Programming, Software Dev.
   - 32 Programmers, Software Developers

   OTHER COMPANY MANAGEMENT
   - 11 President, Owner/Partner, General Mgt.
   - 12 Vice President, Asst. VP
   - 13 Treasurer, Controller, Financial Officer
   - 41 Engineering, Scientific, R&D, Tech. Mgt.
   - 51 Sales & Mktg. Management

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   - 60 Sys. Integrators/VARs/Consulting Mgt.
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   - 80 Manufacturer of Computers, Computer-Related Systems or Peripherals
   - 85 System Integrators, VARs, Computer Service Bureaus, Software Planning & Consulting Services
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   - 75 User: Other _____
   - 95 Vendor: Other _____ (Please specify)

2. **TITLE/FUNCTION** (Circle one)
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   - 21 Dir./Mgr. MIS Services, Information Center
   - 22 Dir./Mgr. Tech. Planning, Adm. Svcs., Data Comm., Network Sys. Mgt., Dir./Mgr. PC Resources
   - 23 Dir./Mgr. Sys. Development, Sys. Architecture
   - 31 Mgrs. Supry. of Programming, Software Dev.
   - 32 Programmers, Software Developers

   OTHER COMPANY MANAGEMENT
   - 11 President, Owner/Partner, General Mgt.
   - 12 Vice President, Asst. VP
   - 13 Treasurer, Controller, Financial Officer
   - 41 Engineering, Scientific, R&D, Tech. Mgt.
   - 51 Sales & Mktg. Management

   OTHER PROFESSIONALS
   - 60 Sys. Integrators/VARs/Consulting Mgt.
   - 70 Medical, Legal, Accounting Mgt.
   - 80 Educator, Journalists, Librarians, Students
   - 90 Others _____ (Please specify)

3. **COMPUTER INVOLVEMENT** (Circle all that apply)
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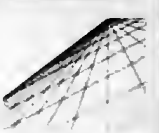

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MARKETPLACE

The dangers of downloading

It's 1990 — does your firm know how to purchase information services?

BY PETER MARX
SPECIAL TO CW

If the 1980s was the decade of the personal computer, the 1990s promise to be the decade of information services. For IS veterans familiar with efforts to enforce PC standards, bringing the use of information services under control may seem like "deja vu all over again."

Historically, information services have been bought in much the same way as PCs were purchased in corporate America six or seven years ago. Without corporate standards, they have been obtained by small groups or individuals.

But the practice is changing. Today, many companies that use information services heavily are looking at ways to centralize and consolidate their purchasing and distribution in the hope of keeping costs down to earth.

For companies that are just hopping aboard the on-line bandwagon, applying central controls will be easier, but still no Sunday picnic. The effort still will require strategic thinking, careful planning and smart execution.

An intelligent start to solving the information problem is the formation of two task forces. The first would be charged with addressing the problem of what information to buy and how to obtain it cost-effectively. The second one would concentrate on finding methods of distributing the data efficiently.

The first task force should start the planning process with an exhaustive audit of each business unit's consumption of external information. This audit should include data delivered on paper. The audit also should encourage each business unit to submit a list of electronic services it would like to receive if availability and expense weren't factors.

Once this fact-finding is complete, the second task force takes over. Its mission is to determine how new electronic data will be used once it is acquired. For example, will the information simply be read from a screen, or will several copies of it be printed and distributed? Will data be downloaded for short- or long-term storage? Will value be added to it so that it can be resold to customers?

Obviously, the answers to these questions will determine which existing information systems will do the job and which new ones must be built. In addition, the way your organization plans to use electronic information will influence the cost of the services you buy and the contracts you establish.

WHEN IS GROUPS lay down standards or controls, they achieve overnight status as party poopers.

Chances are that your company is already using purchased data departmentally. If so, it could be unintentionally violating vendor contracts that limit how services may be used.

As software vendors were quick to point out in the 1980s, software piracy, deliberate or unintentional, costs tens of millions of dollars annually. The industry responded to this threat with vigorous legal action.

There have been no comparable lawsuits in the information services industry. But it's safe to assume that few IS directors would be eager for their companies to become the first targets. Information service vendors, like software makers, want fair compensation for use of their data, and they aren't eager to help other companies repackage it and become competitors.

As a result, the typical information service agreement contains substantial restrictions on what can be done with the data. Thus, it is critical to negotiate how your firm will use digital information before signing a vendor's contract. Doing so may help avoid problems and expenses arising from contract violations. Vendors' concerns are justified, but most companies are flexible and willing to modify standard agreements when customers show a compelling need to use information services in ways that are a bit unusual.

There are other legal issues to consider, too, such as copyright protection and liability. They arise partially because our 19th-century intellectual property laws haven't kept pace with the evolution of technology.

Standard agreements all restrict liability. But it's virtually impossible to persuade the information vendor to indemnify your company completely for erroneous information that it supplies or that you redistribute to your own customers. It's important to review the limits of your liability insurance to ensure your organization will be covered should legal problems arise.

If you repackage information to redistribute it to your own customers, liability waivers should be included in the contracts you establish with them.

Too often, when IS groups lay down standards or controls, they achieve overnight status as party poopers. With information services, the story could be different. Few end users really understand their rights and obligations or the risks involved in using them. Systems to enhance the value of purchased services either don't exist or don't work very well. If IS groups can supply solutions to these problems, they can come off looking like liberators rather than dictators.

Marx is a principal at The Marx Group in Wellesley, Mass., where he advises companies on business deals involving information services.

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The BoCoEx index on used computers

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	Closing price	Recent high	Recent low
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XT Model 086	$700	$825	$700
XT Model 089	$850	$900	$700
AT Model 099	$1,250	$1,600	$1,200
AT Model 239	$1,825	$1,850	$1,700
AT Model 339	$1,975	$1,975	$1,700
PS/2 Model 50	$1,800	$1,900	$1,500
PS/2 Model 60	$2,425	$2,700	$2,425
Compaq Portable II	$1,700	$1,725	$1,550
Portable III	$2,400	$2,500	$2,000
Portable 386	$1,900	$2,000	$1,600
Plus	$750	$950	$675
Deskpro	$900	$1,200	$800
Deskpro 286	$1,525	$2,025	$1,300
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Request for Proposal No. 1736, due Tuesday, March 6, 1990 at 3:30 p.m. for the acquisition of an upgrade to an existing Token Ring Local Area Network for the UNIVERSITY OF MISSISSIPPI MEDICAL CENTER Physical Plant.

Request for Proposal No. 1738, due Wednesday, February 28, 1990 at 3:30 p.m. for the acquisition of all hardware, software and services necessary to establish a local area network to connect the existing microcomputer equipment of the MISSISSIPPI DEPARTMENT OF AGRICULTURE AND COMMERCE.

Detailed specifications may be obtained from the CDPA office. The CDPA reserves the right to reject any and all bids and proposals and all minor information.

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The Financial Information Services Agency of the City of New York is requesting that qualified vendors submit a Request for Proposal ("RFP") for 3270 EQUIPMENT MAINTENANCE. Copies of the proposal are available for all those who are interested. For further details, call Ms. Marlene Duran-Cintron at 212-306-3111/3311

A Proposers Conference is scheduled for Wednesday, February 28, 1990 at 10:00 AM at 111 Eighth Avenue, 13th Floor New York, NY 10011

All proposals are due by 5:00 PM on March 14, 1990. Please address them to the Office of the General Counsel, Attention: John W. Wolff, General Counsel, 111 Eighth Avenue, 16th Floor, Room 1017, New York, NY 10011.

Further details regarding the conference, specifications and proposal submission may be found within the RFP

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Evaluations that rate a '10'

Are you getting the most from your best source of student feedback?

BY NAOMI KARTEN
SPECIAL TO CW

Many training sessions conclude with the distribution of an evaluation form that asks students to rate the instructor, the course content and the materials. Although these evaluations don't measure comprehension or retention, they can be helpful in planning future classes. Thus, it is worthwhile to get feedback that is complete and detailed. Techniques that can help include providing ample space for comments, giving students sufficient time to complete the form and using midcourse evaluations.

Use of comments. Most evaluation forms ask students to rate a series of attributes using a numbered scale or a similar range of values, such as low to high or poor to excellent. By themselves, these evaluations-by-the-numbers can be deceptive and lead trainers to draw the wrong conclusions about the quality of a class.

The misleading nature of numerical ratings becomes apparent when forms provide space for additional comments. In one case, a student rated a class 10 on a 10-point scale across the board but offered several criticisms about features and activities that he thought should have been included. Another student praised the same class lavishly but gave it sevens and eights. It is clear that numerical ratings have different meanings to different people and that student reactions can be misinterpreted if evaluations are based on them alone.

Most evaluation forms provide space for comments, but the space is often minimal. Students tend to limit their comments to the room that is provided. When there is plenty of room, their comments often address more than the attributes they are asked to rate. On one form that asked students to rate the usual factors, one of them offered several comments on the balance between the instructor's presentation and class discussion. Another suggested some class exercises that could help to reinforce certain points. A third described some specific problems that the course material would help to resolve.

An evaluation form can dispense with numerical ratings altogether, inviting students to comment on what they liked and didn't like about the content, the instructor's delivery and the materials. Comments in such evaluations are often wide-ranging, offering considerable detail and constructive criticism that might not otherwise be raised.

Timing. Students are typically asked to spend the final few minutes of a class completing their evaluation forms. At this point, they are tired and eager to leave. Some may depart without completing the form. Others finish it hastily, with one foot already out the door. The instructor ends up with minimal feedback.

Instructors can dramatically improve the feedback they get by informing students early in the class about the evaluations, then providing time during class hours to fill them out. In a two-day class, for example, the instructor can call attention to the evaluation form at the start of the class, at the end of the first day and at the start of the second day. Then students can be given extra time during an afternoon break to work on the evaluation.

Students reach conclusions about a class well before it's over, and there is little that can happen during the final hour or two that will salvage a class that's floundering or ruin one that's been well-presented.

The instructor can further ensure detailed responses by emphasizing that the evaluations are important and will be reviewed carefully. The result is that students spend much more time completing the forms. They provide extensive and valuable comments that go far beyond numerical ratings.

Midcourse evaluations. Regardless of when students actually complete their evaluations, the instructor typically doesn't collect them until the end of the class. At that point, it's too late to make adjustments that could improve the class or eliminate problems of which the instructor is unaware.

In a multiday class, instructors can help the class and themselves by requesting an interim evaluation at the end of the first day. A first-day evaluation has the same format as the final one. From the resulting ratings and comments, the instructor can gauge whether the class is on target, make midcourse corrections and meet one-on-one with students who are experiencing problems. A midcourse evaluation conveys the message to students that the instructor is interested in making the class work for them, and this alone can help boost the final ratings.

Review of responses. Regardless of the format and timing of the evaluation, the resulting information is worth little unless training managers review it and take it into account in planning future classes. However, in the press of other duties, it is common for evaluations to be scanned quickly and dropped into a drawer indefinitely — or until some situation arises that requires the training group to justify its existence or demonstrate its competence.

Karten is president of Karten Associates in Randolph, Mass., and editor of the monthly newsletter "Managing End-User Computing."

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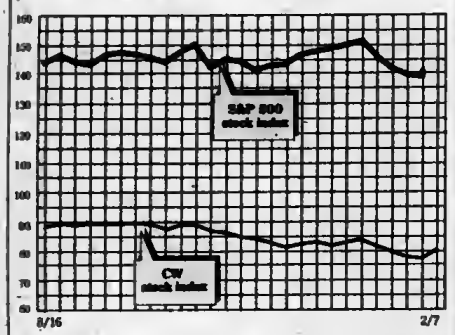

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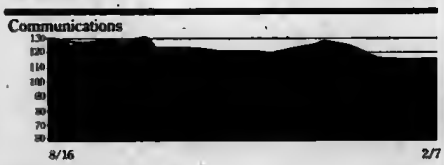
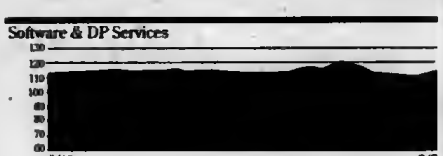
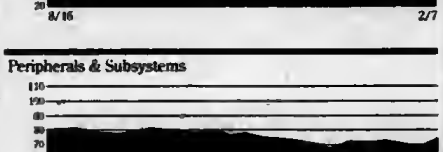
Communications	116.2	117.4
Computer Systems	75.8	78.7
Software & DP Services	110.6	114.9
Semiconductors	48.5	50.7
Peripherals & Subsystems	69.7	74.7
Leasing Companies	84.1	87.5
Composite Index	77.8	81.0
S&P 500 Index	138.8	140.8







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C		52-WEEK RANGE	CLOSE FEB. 7 1990	WEEK NET CHNGE	WEEK PCT CHNGE
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Communications and Network Services

N	AMERICAN INFO TECHS CORP	68	50	57.625	-2.1	-3.6
Q	ANDREW CORP	28	18	23.25	0.5	2.2
Q	ANTEL COMM CORP	9	7	7.625	-0.1	-1.8
N	AT&T	47	20	39.875	0.8	2.2
Q	AVANTEK INC	7	2	2.5	-0.5	-16.7
N	AYDIN CORP	21	16	16	0.5	5.3
N	BELL ATLANTIC CORP	114	72	92.75	-5.0	-5.1
N	BELLSOUTH CORP	60	40	52.875	0.5	1.0
Q	COMPRESSION LABS INC	13	4	12.125	2.3	22.8
Q	CONTEL CORP	37	25	26.375	0.8	1.8
Q	DATA SWITCH CORP	6	2	2.875	0.0	0.0
Q	DIGITAL COMM ASSOC	20	17	21	0.8	4.3
Q	DYNATECH CORP	21	16	17	0.5	3.0
Q	FABRICOM'S INTNL INC	7	4	5.75	-0.1	-2.1
Q	HANDALF TECHNOLOGIES	7	3	3.313	-0.3	-8.6
N	GENERAL DATACOMM INDS	7	4	4.5	-0.1	-2.7
N	GTE CORP	72	44	63.125	0.8	0.8
Q	HYPERTECH SYS CORP	13	9	?	0.0	0.0
N	ITT CORP	68	51	53	-1.0	-1.9
N	M A COM INC	9	4	4.120	0.0	0.0
Q	MCI COMMUNICATIONS CORP	46	24	32.5	0.0	0.0
N	NETWORK EQUIP TECH INC	32	18	24	-0.5	-1.8
Q	NETWORK SYS CORP	10	7	8.875	0.5	7.8
N	NORTHERN TELECOM LTD	24	14	23.875	0.5	2.1
N	NOVELL INC	34	24	34	-4.0	13.3
N	PANEV CORP	122	67	79.75	-1.8	-2.1
N	PACIFIC TELESIS GROUP	52	33	45.875	0.1	0.3
A	PENRIL CORP	9	4	9.25	0.8	4.2
N	SCIENTIFIC ATLANTA INC	25	14	24.25	2.0	9.0
N	SOUTHWESTERN BELL CORP	69	42	64	1.1	2.1
Q	3 COM CORP	24	10	11.125	0.1	1.1
N	U S WEST INC	61	46	56.875	0.8	1.1

Computer Systems

Q	ALLIANT COMPUTER SYS	7	3	6.625	0.8	3.9
Q	ALPHA MICROSYSTEMS	9	4	3.875	-0.3	-5.1
Q	ALTOS COMPUTER SYS	8	6	6.5	0.3	4.8
A	AMDAHL CORP	25	11	18.5	-0.3	-1.6
Q	APPLE COMPUTER INC	50	32	33.25	0.8	2.2
N	BOLT BERANEK & NEWMAN	11	6	5.125	0.1	2.5
N	COMPAQ COMPUTER CORP	113	66	86.125	10.4	13.7
N	COMMODORE INTNL	20	7	6.375	0.0	0.0
Q	COMPUTER AUTOMATION INC	9	2	4	1.3	48.5
N	CONTROL DATA CORP	24	16	17.75	0.8	4.4
N	CRAY RESH INC	61	31	48.5	2.4	5.4
Q	DAISY SYS CORP	7	0	0.625	-0.1	-16.7
N	DATA GEN CORP	20	8	8.75	0.1	1.3
N	DATAPOINT CORP	9	3	3.75	0.0	0.0
Q	DELL COMPUTER CORP	9	6	7.25	2.6	56.8
N	DIGITAL EQUIP CORP	117	75	79.125	0.0	0.0
N	FLOATING POINT SYS INC	4	1	1.5	-0.1	-7.7
N	HARRIS CORP	40	27	30.125	2.6	8.1
N	HEWLETT PACKARD CO	62	40	47.625	3.0	6.7
N	HONEYWELL INC	92	62	82.5	1.3	1.5
N	IBM	124	93	103.125	4.5	4.6
Q	INFORMATION INTL INC	19	12	12	-0.5	-4.0
Q	IPL SYS INC	8	6	6.75	0.6	3.8
N	MAI BASIC FOUR INC	11	2	3	0.3	5.1
Q	MATSUSHITA ELEC INDL LTD	186	154	155	-4.3	-2.7
Q	MENTOR GRAPHICS CORP	25	14	16	0.8	2.4
N	NBI INC	3	0	0.313	-0.1	-16.5
N	NCR CORP	70	53	68	1.5	2.9
Q	PYRAMID TECHNOLOGY	25	8	24.25	3.3	15.5
Q	SEQUENT COMP SYS INC	25	10	22.125	2.6	14.8
Q	SHAREBASE CORP	4	0	0.563	0.0	0.0
Q	SUN MICROSYSTEM INC	20	13	21.75	2.4	12.3
Q	SYMBOLICS INC	8	3	3.875	0.1	18.7
N	TANDEM COMPUTERS INC	28	15	27.75	-0.3	-0.9
N	TANDY CORP	49	34	34.125	-1.3	-3.5
N	ULTIMATE CORP	12	7	8	0.1	1.5
N	UNISYS CORP	30	12	14.25	0.6	4.9
A	WANG LABS INC	11	4	4.125	0.0	0.0

Software & DP Services

Q	AMERICAN MGMT SYS INC	16	11	12.25	0.9	7.7
Q	AMERICAN SOFTWARE INC	25	11	21	2.6	14.3
N	ANACOMP INC	8	6	4.5	0.5	12.5
Q	ANALYSTS INTL CORP	20	11	16.3	0.8	1.8
N	ASHTON TATE	24	9	11.875	1.9	18.8
Q	ASK COMPUTER SYS INC	10	7	9.625	1.4	16.7
N	AUTO DATA PROCESSING	51	36	45.875	2.8	6.1
Q	AUTODESK INC	44	27	42.75	3.3	8.2
Q	BASIC SOFTWARE INC	25	14	29.625	0.8	2.2
N	BUSINESSLAND INC	15	7	7.25	0.8	7.4
Q	COGNOS INC	9	4	4.375	-0.1	-2.8
N	COMPUTER ASSOC INTL INC	22	11	12.875	1.1	9.6
Q	COMPUTER HORIZONS CORP	11	7	8.5	-0.4	-4.2
N	COMPUTER SCIENCES CORP	66	47	49.125	1.4	2.9
N	COMPUTER TASK GROUP INC	16	6	9.5	0.0	0.0
Q	COMSHARE INC	42	24	36.5	2.5	7.4
Q	CORPORATE SOFTWARE	19	8	9.25	0.5	5.8
N	GENERAL MTRS (CLS E)	66	43	52.125	2.5	5.8
Q	HOGAN SYS INC	7	4	3.875	-0.3	-6.1
Q	INFORMIX CORP	16	8	15.75	1.1	7.7
Q	INTELLICORP INC	6	3	4.313	0.1	1.5
Q	LEGENT CORP	32	21	27.625	1.4	8.2
Q	LOTUS DEV CORP	34	16	29.75	1.0	3.5
Q	MANAGEMENT SCI AMER	19	9	0.01	0.0	0.0
Q	MICROSOFT CORP	96	46	93.25	0.6	0.8
Q	NATIONAL DATA CORP	34	25	34.75	0.8	2.7
N	ON LINE SOFTWARE INTL INC	11	6	6.875	0.1	1.3
Q	ORACLE SYS CORP	24	11	21.375	-0.1	-0.6
N	PANSOPHIC SYS INC	16	12	16	0.6	3.2
Q	PHOENIX TECHNOLOGIES INC	16	3	3.25	0.6	8.3
Q	POLICY MGMT SYS CORP	34	25	34.625	2.6	8.2
Q	PROGRAMMING & SYS INC	25	16	17.5	0.0	0.0
Q	RELATIONAL TECH INC	16	5	7.5	0.3	3.4
N	REYNOLDS & REYNOLDS CO	24	19	20	0.1	0.5
Q	SAGE SOFTWARE INC	11	7	9.375	0.1	1.4
Q	SEI CORP	20	15	14.75	-0.5	-3.3
Q	SHARED MED SYS CORP	16	12	12.875	0.0	0.0
Q	SOFTWARE PUBG CORP	21	10	16.25	-2.8	-14.5
A	STERLING SOFTWARE INC	9	5	8.875	0.8	4.4
Q	SUNGARD DATA SYS INC	24	13	22.75	3.5	18.2
Q	SYSTEMATICS INC	40	30	30.5	0.5	1.7
N	SYSTEM CENTER INC	24	16	23.75	2.5	10.9
N	SYS. SOFT INC	24	12	23	1.8	8.2
Q	WORDSTAR	3	1	0.815	-0.1	-8.7

Semiconductors

N	ADV MICRO DEVICES INC	11	7	7.375	0.1	1.7
N	ANALOG DEVICES INC	12	7	7.375	-0.3	-3.3
Q	ANALOGIC CORP	11	8	9.875	0.0	0.0
Q	CHIPS & TECHNOLOGIES INC	24	14	18.25	1.8	10.5
Q	INTEL CORP	41	23	40.25	0.8	1.8
Q	MICRON TECHNOLOGY INC	24	7	9	1.3	16.1
N	MOTOROLA INC	84	40	58.625	4.0	7.3
N	NATL SEMICONDUCTOR	9	5	6.125	0.1	2.1
N	TEXAS INSTRS INC	47	24	34.5	1.1	3.4
A	WESTERN DIGITAL CORP	16	6	9.625	0.9	10.0

Peripherals

Q	ALLOY COMP	6	1	1.75	-0.4	-17.6
N	AM INTL INC	6	6	3.875	0.8	10.7
Q	AST RESH INC	16	7	14.875	2.5	17.8
Q	AUTO TROL TECH CORP	9	6	3.313	0.1	1.9
Q	BANCTEC INC	20	11	18	2.1	13.4
Q	CIPHER DATA PRODS INC	11	9	7	0.6	3.7
A	COGNITRONICS CORP	6	3	5.25	1.0	22.5
Q	CONNOR PERIPHERALS	16	7	15.124	2.5	21.0
Q	DATAPRODUCTS CORP	16	6	6	0.0	0.0
A	DATARAM CORP	12	9	11.124	1.6	16.8
N	EASTMAN KODAK CO	62	37	38.375	0.3	0.7
N	E M C CORP MASS	6	6	4.25	0.0	0.0
Q	EMULEX CORP	12	6	5.25	0.0	0.0
Q	EVANS & SUTHERLAND	24	16	24.75	1.0	4.2
Q	IDOT CORP	3	1	1.8	0.1	6.1
Q	INTERLEAF INC	10	6	9	0.6	4.3
Q	IOMEGA CORP	4	2	3.5	0.6	3.6
Q	LEE DATA CORP	4	1	1.75	0.0	0.0
Q	MASSTOR SYS CORP	4	2	1.938	-0.1	-3.1
Q	MAXTOR CORP	12	7	11	1.6	17.3
Q	MICROPOLIS CORP	6	3	4.5	0.6	16.1
Q	MINISCRIBE CORP	9	0	0.301	0.0	-3.7
N	MINNESOTA MNG & MFG CO	84	66	80.875	2.5	3.5
Q	PERSONAL COMP PRODUCTS INC	6	9	3.618	-0.1	-1.8
Q	PRINTRONIX INC	10	7	8.75	0.1	1.3
N	QMS INC	14	7	13.5	0.5	6.9
Q	QUANTUM CORP	17	9	11.25	2.1	23.3
N	RECOGNITION EQUIP INC	19	6	8.375	0.1	2.0
Q	REXON INC	6	6	6.875	0.6	10.0
Q	SEAGATE TECHNOLOGY	16	6	10	2.6	16.8
N	STORAGE TECH CORP	23	9	17.25	1.1	7.0
Q	TANDON CORP	1	0	0.813	0.1	8.4
N	TEKTRONIX INC	24	16	16.625	0.0	0.0
Q	TELEVIDEO SYS INC	1	0	0.25	0.0	14.2
N	XEROX CORP	86	63	65.5	0.0	0.0

Leasing Companies

Q	AMPUCOR INC	115	6	9.25	0.6	4.8
N	CAPITAL ASSOC INTNL INC	6	3	3.75	0.6	15.4
N	COMDISCO INC	34	21	23.75	0.6	2.2
Q	CONTINENTAL INFO SYS	2	0	0.234	0.0	0.0
Q	LDI CORPORATION	18	13	14.75	0.6	2.6
Q	PHOENIX AMERN INC	5	3	3.125	0.0	0.0
Q	SELECTERM INC	9	6	6	0.6	4.3

EXCH: N=NEW YORK; A=AMERICAN; Q=NATIONAL

Hog wild

Investor idiosyncracies spur revels without a cause

In an otherwise tame time, technology stocks went wild last week. Why? "WTHK?," said Paine Webber, Inc.'s Robert Therrien. It's not a mystery ticker; it's the mystery factor — and often a ruling one on Wall Street: "Who The Heck Knows?"

This time, the WTHK factor set an upward trajectory. Even a late-week dip left such gainers as IBM, which closed on Thursday at 102¾, up 4¾ points; Digital Equipment Corp., up 3⅛ points to 79¾ at Thursday's close, and Compaq Computer Corp., which rose 7⅛ points to 85⅛.

Also feeling the surge were Hewlett-Packard Co., up 2⅜ points at 47½ on Thursday; Lotus Development Corp., which ended the week at 30, a gain of 1½; Sun Microsystems, Inc., up 2¼ points at 21¾; Intel Corp., up 1½ points at 40½; Seagate Technology, Inc., which rode the wave to a Thursday close of 18¼, up 1⅛ points; and Conner Peripherals, picking up 2 points to end the week at 15¼. Microsoft Corp. and Oracle Systems Corp. each ended the week up ½ of a point. Microsoft closed at 94½ and Oracle checked in at 21¾.

Silicon Graphics, Inc. got a gift from the Wall Street Welcome Wagon — a gain of 3⅛ points to boost the company to a new 52-week high of 32⅜ in its first week of trading on the New York Stock Exchange.

The rumored departure of yet another colorful executive (see story page 1) knocked Apple Computer, Inc.'s stock down ⅜ of a point; Apple ended the week at 33.

NELL MARGOLIS

NEWS SHORTS

CDC to sell tape system

Control Data Corp. last week unveiled the first OEM version of Storage Technology Corp.'s automated cartridge library system. Under the $50 million agreement, CDC will market the system, which uses optical scanning and robotics to find and load tape cartridges, and make it available for its NOS/VE-based Cyber mainframes. The product was previously available only for IBM-compatible mainframes. Early next year, support will be added for CDC's Unix-based Control Data 4000 departmental computers. Pricing for an entry-level 5744 Cartridge Library System with one storage module and a 5680 Cartridge Tape Subsystem starts at $495,000.

DEC links with AT&T via ISDN

Building upon an agreement made with AT&T last June to develop integrated voice and data applications, Digital Equipment Corp. has enhanced its All-In-1 system for customer services software and Decvoice Response System. DEC added a link, through AT&T's ISDN Gateway, between DEC VAX minicomputers and the AT&T Definity and System 85 private branch exchanges. The announcement follows a similar move by IBM to link its hosts with AT&T switches.

Rolm enhances 9750

Rolm Co. last week announced enhancements to the Rolm 9750 Business Communication System, an on-premises switch. Rolm, an IBM and Siemens Corp. company, doubled the number of automatic call distribution agents supported and lines available for IBM's Callpath database access service. In addition, the Rolm Phonemail system has been integrated with AT&T's #5ESS central office switch.

M&D releases asset manager

McCormack & Dodge Corp. last week announced availability of Fixed Assets:Millenium for the DEC VAX — the first product introduced for the DEC environment since M&D merged with rival Management Science America to form Dun & Bradstreet Software earlier this year. An M&D official said the firm will continue with its plans to bring all of its major IBM products to the VAX platform. The Fixed Assets software follows other VAX offerings from M&D, including general ledger and accounts payable.

IBM maps GIS plan

IBM last week announced a geographic information system (GIS) management tool that allows users to create, maintain and access GISs across a multitude of databases. Geomanager enables users to access geographic data through 3270-type terminals and interact with other office system software such as electronic mail and business graphics. Scheduled for availability this June at prices ranging from $28,100 to $193,400, Geomanager runs on System 370 processors.

Aldus enhances Pagemaker

Desktop publishers working with long text files may appreciate the 75 enhancements to Aldus Corp.'s Pagemaker for the Apple Computer, Inc. Macintosh. Version 4.0 adds user-requested features such as a spelling checker, search-and-replace command and Story Editor — an alternative, text-only window that allows for significantly faster word processing. The $795 package is slated for shipment in the second quarter. The minimum configuration is a Mac Plus or SE with 1M byte of random-access memory and a 20M-byte hard disk.

Compaq, Novell strike deal

Though most systems managers agree that networks are a great idea, those managers usually throw in complaints about too much network downtime. In an effort to boost network dependability, Compaq Computer Corp. and Novell, Inc. are combining development forces to address fault tolerance. The goal is to meld Novell technology with Compaq's Systempro multitasking to provide a mirror-image server on the network.

Tandy offerings stay close to home

BY RICHARD PASTORE
CW STAFF

NEW YORK — No, Tandy Corp. did not announce glitzy EISA or 486-based personal computers here last week, as some observers had anticipated. It didn't unveil a sleek, six-pound, full-function notebook computer, either. Instead, the firm stood by its bread-and-butter home consumer and small business markets, introducing five soberly designed and priced PC models.

Yet, Tandy's commitment to low-end, low-cost products may be tested in the near future. The PC maker and distributor has not escaped the profit-margin pressures that put resellers such as Businessland, Inc. and Computerland Corp. in the red last quarter. Tandy's net profit was down 13% for the quarter ended Dec. 31.

"The desktop business has gotten very price-sensitive, and you have to look to selling some high-priced machines in order to fully achieve growth from a dollar perspective," Chief Executive Officer John Roach said in a recent interview.

Tandy has sacrificed glitz for low price points. The 2800 HD is a full-function laptop PC, but it weighs in at a hefty 12½ pounds. "To take off another four or five pounds would have added another $2,000 to the price," said Tandy spokesman Ed Juge.

The $3,500 machine, available now, is Tandy's first Intel Corp. 80286-based laptop. It features a full-size backlit display, 1M byte of internal memory and a 3½-in., 1.44M-byte floppy disk drive. The two-hour battery life expectancy is based on a 10% disk access time, and the user can swap batteries without shutting down the system, Tandy said.

The four new desktop machines run the gamut of processing power, from a 10-MHz 286 to a 16-MHz Intel 80386SX to a 33-MHz Intel 80386 — Tandy's most powerful model to date. All are currently shipping except the 33-MHz box, due in March. The 286 and 386SX models will also be sold under Tandy's Grid Systems Corp. label.

For now, Tandy has passed up Intel's bug-plagued 1486 microprocessor. "We'll go with a 486 machine when everything is just right for that box," Roach said.

In addition, none of Tandy's new boxes incorporates the Extended Industry Standard Architecture bus. "We're not sure the bus architecture is all that important for the average application anyway," Roach said.

Despite margin pressures, Tandy is not yet ready to write off 286-based sales, which this year are expected to equal 386 and 386SX unit sales among Fortune 1,000 firms, according to Computer Intelligence in La Jolla, Calif.

"At least for the DOS world — which is the principal world we still have out there — the 286 machine is a very satisfactory engine," Roach said.

Apple

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would be felt throughout Apple.

However, even Soucy admits that Apple's recent products have not been right for his needs. "They've been concentrating on the high end, but the masses are looking more for an 80286 PC-competitive product."

The shining star of the computer industry in recent years, Apple has again bogged down into a period in which domestic sales are off; profits have fallen, and Sculley has announced plans for the first major layoff in five years.

Apple needs to reshuffle its deck now if it intends to have significant low-end Macintosh products on the shelves in time for the fall, according to several analysts contacted by *Computerworld*.

Key engineering and marketing decisions must be made immediately if Apple hopes to make an impact, they said.

Although Sculley has publicly stated that he favors the creation of a low-end product, Gassee seems lukewarm on the idea. Several weeks ago he told *The Wall Street Journal*, "You don't do a low-cost version of yesterday's product. It's bad karma."

Some large users would welcome a shake-up in the product area. "I think it's about time that this happened; maybe the prices will come down," said Michael De Pavia, systems manager at KPMG Peat Marwick in San Francisco.

Although Gassee is credited with lighting the fire that created the highly successful Macintosh SE and high-powered Macintosh II lines, he has lately become the scapegoat for Apple's product failings.

"Apple has been very slow relative to the industry in terms of new product flow," said Frederic Cohen, an analyst at Labe Simpson & Co. in New York.

Gassee *future role "being discussed"*

Overall, most users do not seem worried about the health of the company. "Even though Apple didn't make the megabucks it planned, they're by far very, very sound," De Pavia said.

Nevertheless, the recent Apple staff shake-ups and layoffs have prompted ripples of unease throughout the industry.

"I don't have any immediate sense of panic — my concern in the long run is how it would affect products," said Richard Conrad, director of computer services at Bowling Green State University. Conrad is hoping for a lower cost box with the functionality of the Mac SE. If Apple does not deliver, he will give IBM a look, he said.

The Mac is not set in stone at Peat Marwick, either. DOS-based PCs with graphical user interfaces "attract me a lot," De Pavia said. "I'll certainly be open to consider it."

His own style

Jean-Louis Gassee, 46, is one of the last distinctive personalities in a company once renowned for colorful characters. In his nine years at Apple, he has been known for peppering his speech with bawdy sexual metaphors and attending press events sporting a leather jacket and diamond earring.

"Jean-Louis captured the essence of the Mac spirit," said Alan Soucy, a vice-president at the MACIS user group and manager of computing standards at Martin Marietta Information Systems Group, which has about 6,000 Macs installed.

Despite his flashy style, Gassee could be a terror in business matters; at a recent shareholders' meeting, he icily cursed at reporters who questioned him about his future in the company. "American top executives are trained to be diplomatic like politicians; Gassee would just say 'screw you' to your face," said David Wu, an analyst at S. G. Warburg & Co. in New York.

The report of Gassee's resignation comes only two weeks after a major bloodletting that saw the resignation of Allan Loren as head of the troubled U.S. sales and marketing unit and the appointment of Apple Europe head Michael Spindler to the newly reinstituted post of chief operating officer.

IBM: Critics way off base where AS/400's concerned

BY ROBERT MORAN
CW STAFF

The Application System/400 and Enterprise System/9370 systems announced by IBM last week took a backseat as Steven Schwartz, IBM's vice-president and general manager of applications business systems, held forth on what he deemed the inaccurate myths surrounding the AS/400.

"Despite our strong '89 and our prospects for 1990, it is amazing that we can't dispel this perception that the AS/400 will dry up and blow away," Schwartz said.

Responding to widespread industry skepticism about the continued success of the AS/400, Schwartz declared: "The critics who say that we are not expanding the market are not accurate, and the critics who say that we are not reaching large, complex customers are also inaccurate."

To buttress his assertions, Schwartz said the AS/400 exceeded by 10% IBM's June 1988 expectations for shipments to customers who did not have a System/34, 36 or 38. According to Schwartz, new account shipments represented 40% of the AS/400 business, competitive replacements accounted for 13% and migration from System/34, 36 and 38 machines represented 47%.

"We are growing the market, not just migrating our base," Schwartz said. He added that IBM has replaced only about one-third of its installed base of System/38s, leaving a huge migration revenue opportunity in the offing.

Primary aim small

However, Schwartz said that IBM will target the AS/400 primarily at small and intermediate-size organizations during the next five years, although not to the exclusion of other organizations such as the yet-to-migrate System/38 users.

However, in an interview earlier this year, Schwartz acknowledged that although low-end unit shipments, which could seed future AS/400 sales, were lower than expected, they were not a major cause of concern.

To further prove his point that the AS/400 has been flourishing, Schwartz said that in the last quarter of 1989 the number of customers with more than one AS/400 increased by 326.

IBM doubles up

IBM announced new entry-level models last week for both the Application System/400 and the Enterprise System/9370 series of midrange processors, just one week before the arrival of its replacement for its RT Unix workstations.

According to IBM, the three new AS/400 models, the C10, C20 and C25, offer improvements of 30% to 120% in performance over the Model B10 — the result of enhanced systems processors and the addition of more main memory. Further, the systems feature a new 3½-in., 320M-byte direct-access storage device (DASD) featuring an access time of 12.5 msec.

IBM's AS/400 drive

The C10 costs $20,250 and can carry a maximum of 20M bytes of main storage and 1.2G bytes of DASD. The C20 costs $36,470 and offers a maximum of 32M bytes of main storage and 2.6M bytes of DASD. The C25 costs $63,000 and can carry a maximum of 40M bytes of main storage and 2.6M bytes of DASD.

Models are upgradable from the B10 to the C25, with prices ranging from $7,000 to $42,750, the cost of converting from a B10 or a C10 to a C25.

According to IBM, the Models C10 and C20 will become available on Feb. 23 of this year, and the Model C25 will become available in the second quarter of this year.

In addition, IBM said that its 2440 Magnetic Tape Subsystem Model A12 will now permit customers to install either a 9332 or 9335 DASD on the bottom half of the 2440 tape rack, eliminating the need for an additional rack.

IBM's Model 9404

IBM also announced the ES/9370 Models 10, 12 and 14, which incorporate characteristics of the Personal System/2's Micro Channel Architecture and the 9370 architecture.

Prices for basic configurations containing 4M bytes of memory and two DASDs, each with 295M bytes, start at $29,900 for the Model 10, $36,900 for the Model 12 and $35,900 for the Model 14.

The three models must run under a 370-based operating system — either VM SP or VM IS, VSE Version 4 or DPPX 370.

While the Models 10 and 12 can run only the System/370 operating systems, the Model 14 can interactively run a second operating system — DOS, OS/2 Standard Edition or OS/2 Extended Edition.

ROBERT MORAN

AS/400

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and Compaq Computer Corp. personal computers.

"IBM would obviously rather sell mainframes because of the (profit) margin, but they saw we were going to move in this direction with or without them," said Paul Pavloff, senior director of information resources at Georgia-Pacific.

In shifting to a two-tier computing strategy of minis and microcomputers, the pulp, paper and building manufacturer's goal was to save money and jettison its System/370 technology.

"Our costs in this new environment are significantly lower," Pavloff said. "Most of the savings have been in operations and technical support areas."

About two-thirds of the corporate and building materials applications — including finance, accounting, distribution, sales analysis, order-entry and inventory systems — have already been moved off an IBM 3081 onto the midrange platform.

Georgia-Pacific also serves as a showcase site for IBM when customers are considering a similar downsizing move, the IS chief added. "A lot of the people coming through here are awestruck by the way we're using this hardware," he said. "I think even IBM thought of the AS/400 as a stand-alone replacement for the System/38s and 36s."

IBM has been "groping to understand this phenomenon for the past year," said Dave Andrews, president of ADM, Inc. in Cheshire, Conn., a consulting firm that specializes in AS/400 conversions. He estimated that as many as 500 companies migrated some data processing from IBM mainframes to minis last year, reducing their costs by 20% to 50% while increasing system capabilities.

For Pepperidge Farm, Inc. in Norwalk, Conn., however, it was a change in company philosophy that pushed it down the mainframe slope to midranges and micros. The baked goods company is now entering the last phase of a downsizing operation from an IBM mainframe to a distributed network of a dozen AS/400 machines and roughly 500 personal computers.

"We've undertaken a fundamental strategy to see if we can do MIS better and cheaper," said Douglas Parrish, vice-president of management information systems at Pepperidge Farm. "Our expectations are that we would be saving anywhere from one-quarter to half a million dollars a year."

The data center's 3090 Model 120 will be phased out during the next few years, and System/370 applications in finance, manufacturing and decision support will be replaced with all new AS/400-based applications. Already in place are new manufacturing systems at nine bakery plants as well as a communications package at corporate headquarters to tie together operations, marketing and sales departments.

For Hills Pet Products in Topeka, Kan., the move away from an IBM 3084Q to the AS/400 platform meant "getting information closer to the user," said John Waetzig, manager of computer operations. "The dollars and cents were, of course, a big consideration," he added. "We are estimating a three-year payback, and that's pretty decent."

A subsidiary of Colgate-Palmolive, Hills is the country's largest supplier of prescription diet foods to veterinary offices and pet stores. The $500 million company has an AS/400 Model B40 and a B70 at corporate headquarters and three Model B70s managing its distribution network from Atlanta, Dallas and San Francisco.

Another high-profile IBM user, Kendall Co. in Boston, made a similar switch from mainframes to a network of AS/400s and PS/2 workstations beginning in 1988.

The hospital supplies manufacturer restructured its centralized IS department into seven business units on the "small is better" computing philosophy espoused by then-IS director Ron Cipolla.

Sears opts into 9370

Lauds communications skill of IBM underdog

BY ROSEMARY HAMILTON
CW STAFF

IBM has been waiting years for a story like this.

Sears, Roebuck and Co. went public last week with its major commitment to the Enterprise System/9370, a midrange system with one of the worst image problems in the industry.

The company was a test site for the new low-end 9370 Model 10 (see story at right) and currently has 200 units in production, said Gary Weis, senior vice-president of data networking and technology services at Sears Technology Services, Inc., a subsidiary of Sears.

The Model 10 was selected primarily for its communications capabilities. Eventually, it will also take on applications, such as point-of-sale operations, that IBM Series/1s also handle.

For now, however, Sears has installed the 9370s at various store and office locations around the country to assist in the transfer of local data to and from the corporate mainframe hosts.

Weis said Sears did not previously consider the 9370 because of the price. "Pure and simple, it was a cost issue. It was prohibitive," he said.

Weis said he could not reveal the special bid pricing he received but said an older 9370 with the same software and specifications as the Model 10s would have cost much more. "Clearly, it has met our requirements from a cost and performance standpoint," he said. "Without sounding like a commercial, it has done a good job."

In fact, Weis said the Model 10s are only a piece of the corporatewide computing network, and he stressed that he "in no way would act as a marketing rep" for the 9370.

Weis said Sears was looking for a system that could replace the communications functions previously provided by IBM Series/1s in the field. It did not set out to find a replacement box.

"We wanted a system that will improve network performance and lower the cost in the store environment," he said. "And if we could find one that did that and could also be a future [applications] platform, then that would be the best of all possible worlds."

AIX system preview wins IBM early praise

BY AMY CORTESE
CW STAFF

The wait for IBM's RISC-based System/6000 family of workstations and servers — to be announced Thursday in New York as well as at a gala event for up to 2,000 customers in San Francisco — will be worth it, according to customers and business partners who participated in IBM briefings last week.

For the first time, IBM will find itself in the position of defending its proprietary systems from a parallel product line that in many cases outperforms the former, according to those who were briefed. However, IBM intends to not only draw the lines of demarcation this week but also to lay out plans for how its proprietary and Unix product lines will interoperate, according to business partners participating in the briefings.

"Unix is not SAA, but we're going to make it work as if you didn't know the difference," said Nick Donofrio, president of IBM's Advanced Workstation Division, at a press briefing on IBM's agreement with Next, Inc. last week.

IBM looks on both Systems Application Architecture and AIX as strategic operating environments, said George Conrades, senior vice-president and general manager of IBM's U.S. Marketing and Services Division. According to Conrades, IBM plans to link the AIX and 370 worlds via file sharing, LU6.2, Transmission Control Protocol/Internet Protocol and Open Systems Interconnect. "You can expect to see Sun's Network File Server supported under SAA," he said.

Best of both

IBM will try to have the best of both worlds by targeting the reduced instruction set computing systems at the scientific and engineering market and away from the departmental and business niche that its proprietary Application System/400 has been most successful in.

However, IBM will expand the traditional definition of that market to include technical professionals such as traders and architects. "That's a nice piece of positioning," one software developer said. "It gets it out of the scientific engineering box without encroaching on the AS/400's main business."

Nonetheless, according to one current IBM RT customer in the financial sector, who was briefed but asked to remain anonymous, "It's still an AS/400 killer. It's a case of real overlap."

The nine models, dubbed Power stations or Power servers, will reach beyond 40 million instructions per second. Those briefed by IBM last week said the company did not disclose pricing details.

Along with the RS/6000, IBM will launch a major initiative aimed at the so-called technical computer-aided software engineering (CASE) market — typically used to describe real-time and embedded applications with particular tools such as the Ada and C languages.

According to IBM business partners and industry analysts, IBM will tout a repository product from Atherton Technology, Inc. as the integrating framework for its technical CASE environment. Furthermore, Atherton is said to be the recipient of IBM's next equity investment.

Sources close to both firms said last week that IBM plans to purchase up to 20% of the privately held Sunnyvale, Calif., firm.

IBM tacks Nextstep on to Unix-based systems

BY AMY CORTESE
CW STAFF

IBM officially sanctioned last week the Nextstep graphical user interface for its forthcoming Unix-based systems.

Next, Inc.'s interface will be offered as an option along with the Open Software Foundation's Motif. However, availability of Nextstep applications may lag behind those for Motif when the new IBM systems debut later this week.

At a press briefing last week, Nextstep was positioned by IBM and Next as an environment for business and professional productivity applications.

Bill Filip, assistant general manager of IBM's Advanced Workstations Division further characterized Motif as an industry-standard interface that is supported on a variety of hardware platforms and Nextstep as an innovative alternative. He did not say, however, on which applications one would be better suited than the other.

Rather, IBM seemed to be hedging its bets with its dual-interface strategy. Acknowledging that right now there are very few software applications developed for Motif and Nextstep, Filip said "over time, we will see where it all sorts out."

IBM licensed the Nextstep software in 1988 and has said that it will offer it as an option on its Unix-based product line.

Nick Donofrio, president of IBM's Advanced Workstation Division, mentioned a "patent cross-license" agreement between the two companies but declined to go into detail. When questioned about using AIX or IBM's reduced instruction set computing technology, Steve Jobs, Next's founder and president, said there was no announcement to be made at the time but, "Who knows what might happen?"

IBM will support the Nextstep application programming interface on its AIX systems so that Nextstep applications can be recompiled and moved between a Next workstation and an IBM machine running AIX.

Big Blue

FROM PAGE 1

users are calling the shots, and it is up to IBM to fit their plans.

At several large corporations, information systems executives said that they evaluated IBM's two proprietary midrange offerings, the AS/400 and Enterprise System/9370, and that they would not fit into a two-tier strategy. In some cases, this strategy is firmly in place, while other shops said they are moving in that direction.

"We are clearly two-tiered because three doesn't make sense," said George Sekely, vice-president of computers and communications at Canadian Pacific. "We need information flowing through the business, not concentrated in certain areas," he said.

Sekely, who called the 9370 an "odd piece of merchandise" and dismissed the AS/400 for not being compatible with the 370 architecture, has instead relied on a vast network of personal computers and terminals that are tied to corporate mainframes.

"The PCs now add so much intelligence, and they provide the user friendliness and speed for transactions," Sekely said. "This is not old-fashioned personal computing, like spreadsheets. I'm talking about enhancing mainframe transactions, working in a closer way with the mainframe."

Andy Freeberg

UPS' Erbrick prefers LANs for PC networks

Metropolitan Life Insurance Co. uses a similar computing architecture. The company looked at both the AS/400 and 9370 but saw them used in only a few, select application areas.

"We don't see a departmental system as really needed," said Dan Cavanagh, senior vice-president at Metropolitan Life. "The AS/400 is not a major piece of our strategy. We look at it as a niche machine."

Alamo Rent A Car, Inc. is another site with no plans for midrange systems.

"It is a two-tiered universe for us," said Thomas Loane, vice-president of computers and communications. "We've got thousands of terminals out there. We don't see a need for a middle level. You can do an awful lot on a PC network these days."

United Parcel Service of America, Inc. does not yet have such a two-tiered architecture in place but is moving toward one, according to Senior Vice-President Frank Erbrick.

"If LANs become powerful enough, what do I need a mini for?" Erbrick said. "When they evolve, my instincts say we will see a two-tiered architecture."

Erbrick said he is evaluating the AS/400 for use in a distributed telephone order system that is handled by IBM 8100s, which are now running out of gas.

Chris Schramek

Canadian Pacific's Sekely

Current PC and local-area network technology is not powerful enough to handle this high-volume work load, he said, but "if I had the option, I'd prefer a LAN because of the large PC structure we have."

Prudential Life Insurance Company of America has another large corporation with a two-tier leaning. But it also has AS/400s under evaluation. However, they could lose out to PCs and LANs, according to Malcolm MacKinnon, a senior vice-president and head of IS.

Prudential's MacKinnon

MacKinnon said a testing program began on both AS/400s and PC LAN configurations for the support of the sales and clerical personnel in the field. He said he had no indication of which will prove more useful but also noted that the company has for some time been "heavy users of PCs and LANs that connect with the mainframe."

Yet another user site made a big commitment to AS/400s but is fitting them into a 370 environment because it is the more cost-effective way.

By year's end, the New York Housing Authority should have 140 AS/400s installed throughout its citywide network, according to Paul Lotto, director of systems and computer services. Each of the agency's offices will have its own.

The more logical choice would have been the 9370, since the housing authority uses two 3090-class systems in its central office and eight 9370s at district offices. However, lower end 9370s were rejected for office use, Lotto said, because "the AS/400 lends itself very well to user personnel."

"As soon as you go into the mainframe, you're into all the problems of having system programmers," Lotto explained. "The AS/400 was selected primarily to get the ability of self-support. We won't need programmers all over the place."

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TRENDS

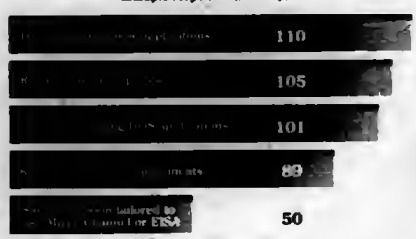
Adoption intentions by industry

It appears that OS/2 will be most prominent in banking and finance, where the majority of respondents indicated that they will move to it within the next two years.

	Number of respondents	Within 24 months	More than 24 months
Medical/ Education	39	16	23
Manufacturing	37	16	21
Other	36	13	23
Government	15	1	14
Banking	14	9	5
Financial	12	8	4

Factors influencing adoption

Number of respondents (Base of 168 – multiple responses allowed).

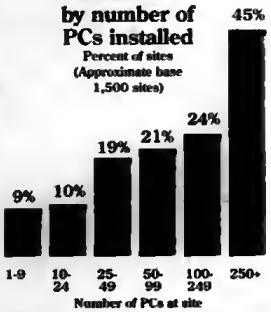


Influencing OS/2 use most is the development of new applications, indicating that users really expect to gain more functionality rather than just increased speed and the elimination of memory restrictions.

CW CHART: TOM MORAHAN

Planned use by number of PCs installed

Percent of sites (Approximate base 1,500 sites)



The more PCs located at a site, the greater the likelihood that site plans to install OS/2. Forty-five percent of sites with 250 or more PCs plan to use OS/2, whereas only 9% of sites with fewer than 10 PCs plan to use it.

NEXT WEEK

The son of a Midwestern preacher, **Tom Lutz** now sermonizes on the evils of large long-range IS projects. A profile of Lutz, the dynamic chief information officer of Armco Advanced Materials Corp., a Pennsylvania steel maker where users, not the IS department, must justify new systems, appears in Manager's Journal.

Nick Rahmer

They can't speak yet, but printers are becoming multilingual as well as multitalented. This new versatility is particularly apparent in the data center, where what used to be a cut-and-dried purchase decision is now fraught with temptations and trade-offs. Product Spotlight describes the latest in print shop possibilities.

INSIDE LINES

Hands-on communications

Netware users prepare (or beware): Novell is going to provide a commercial version of LU6.2 as "an intrinsic part" of its Netware Gateway, starting in a couple of weeks. Until now, the only people who could set up peer-to-peer links between Novell local-area networks and IBM hosts had to put LU6.2 on the gateway themselves, using a Novell tool kit. At Networld, Spectrum Concepts will bring out a version of its XCom LU6.2-based applications software for the gateway, so users will actually be able to use the protocol for something — like maybe file-transfers.

How good was it?

Mosaic Software's Twin clone of Lotus' 1-2-3 spreadsheet was so close a copy that a diskette of Twin was inserted into a $14.95 book on how to use 1-2-3 Release 2.0 on the IBM Personal Computer. Lotus attorney Henry Gutman explained that Lotus officals who saw the book were particularly intrigued by a flag on the package warning "software diskette enclosed." Since Lotus 1-2-3 costs $495, the company knew it couldn't have been 1-2-3.

At least someone is watching now

According to the U.S. Secret Service, a computer hacker threatened to "take down" a telephone switching system at Indiana Bell last summer. The same hacker also said that he was capable of shutting down the telephone company's enhanced 911 emergency telephone system. Another computer hacker penetrated AT&T computer systems in Denver, Atlanta and New Jersey and planted time bombs that would have compromised telephone systems in those areas if they had gone undetected. Also last summer, unidentified hackers rerouted incoming telephones to the Delray Beach, Fla., Department of Corrections Office to a "dial-a-porn" service in New York.

An Apple a day . . .

Apple Computer's Morris Taradalsky was the last-minute pinch hitter for scheduled speaker Allan Loren at last week's *CIO* Magazine/AMR International conference for information systems executives in Laguna Niguel, Calif. Loren's resignation from Apple came well after all conference brochures and promotional material had been printed. Neither Taradalsky's introduction nor his subsequent remarks mentioned Loren.

Repeat after me . . . repeat after me

After patiently listening to six other panel members speak over and over again about the merits of business and systems alignment, re-engineering the corporation, cross-functional integration, productivity, strategic advantage and other hot issues for IS, Eastman Kodak IS executive Henry Pfendt found himself at a loss for words when his turn came to talk at a recent CIO conference. "I feel kind of like Zea Zea Gabor's seventh husband," Pfendt told the audience. "I know what's expected of me, but how do I keep it interesting?"

Under Rod's thumb

Pity Miller Communications. Compaq, its plum account, is not averse to throwing its weight around. A source close to the situation says that Compaq got more than a little upset when it found out that Miller was representing Netframe Systems, which competes against the Compaq Systempro, and Bull, which just bought desktop competitor Zenith Data Systems. We're told that at the "request" of Compaq, Miller no longer represents Netframe or Bull.

As if hacker hero-worship wasn't bad enough, two computer hacker groups allegedly have been tussling with each other for the honor of being top hacker in what the groups call the "super hackerdome," according to a search warrant filed by the U.S. Secret Service in U.S. District Court in Atlanta. We'd like to take team photos — and tack 'em up on post office walls. If you've got any ideas on how the computing community should deal with this issue, pass them along via MCIMail (address: COMPUTERWORLD), fax (508-875-8931), or by phone (800-343-6474) to News Editor Pete Bartolik.

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